CLAIMS

[Claim(s)]
[Claim 1] The flash luminescence means which carries out the preliminary exposure of the photographic subject at the time of measurement, and the luminescence control means which controls luminescence at the time of the preliminary exposure of the above-mentioned flash luminescence means, A luminescence quantity of light setting means to set up the luminescence quantity of light of the above-mentioned flash luminescence means, and an optical on-the-strength distinction means to distinguish the optical reinforcement of the light of the above-mentioned photographic subject, Reserve irradiation equipment for focal detection characterized by having provided a detection means to detect the charge electrical potential difference of the above-mentioned flash luminescence means, having followed the output of the above-mentioned optical on-the-strength distinction means, and the output of the above-mentioned charge electrical-potential-difference detection means, and making free adjustable [of the luminescence quantity of light at the time of measurement].

[Translation done.]

WRITTEN AMENDMENT

-- [a procedure revision]
[Filing Date] November 8, Heisei 5
[Procedure amendment 1]
[Document to be Amended] Specification
[Item(s) to be Amended] 0065
[Method of Amendment] Modification
[Proposed Amendment]
[0065] This subroutine "luminescence amendment" applies amendment to luminescence time amount by A/D value outputted by the subroutine "a charge electrical-potential-difference check" as shown in drawing 14 . That is, when charge A / D value is smaller than #VOL1, only # N 2 shifts (step S520) and AGNO (step S521). And when charge A / D value is larger than #VOL1 (step S520), charge A / D value is compared with #VOL2 (step S522). And when charge A / D value is smaller than #VOL2, only # N 1 shifts AGNO (step S523). here -- compound value [with charge A / D value] # -- VOL1 and VOL2 have the relation of #VOL2>#VOL1. And this AGNO is equivalent to the table of drawing 23 , and #N1 and #N2 are equivalent to the shift amount on a table, and have the relation of #N2>#N1.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the reserve irradiation equipment for focal detection which irradiates a fill-in flash towards a photographic subject at the time of the focal detection by the automatic-focusing detection equipment in photography equipments, such as a camera.
[0002]
[Description of the Prior Art] Conventionally, with the focal detection equipment used for photography equipments, such as a camera, the photographic subject light which carried out incidence through the taking lens is divided into two images, and the passive AF method which performs focus control based on gap of the phase is adopted. The photo detector of an integral mold is mainly used for this focal detection equipment, if light carries out incidence to the integral type concerned of photo detector, according to it, a charge will be accumulated, it will find the integral, and a predetermined output will be made according to that charge with which it integrated. And this integral type of photo detector fixed the product of an illuminance or brightness, and the reset time so that the above-mentioned output might be kept constant.
[0003] Furthermore, for example by JP,59-195605,A, the low brightness of a photographic subject is detected using an integral mold photo detector, and the technique about the focal detection equipment which controls luminescence actuation of a light-emitting part is indicated.
[0004] When taking a photograph with such image pick-up equipment, if a photographic subject is dark, since focus control is difficult, irradiating a fill-in flash towards a photographic subject with the reserve irradiation equipment for focal detection is performed. Since the amount of the charge accumulated mainly in a capacitor had determined the amount of luminescence, the amount of luminescence concerned was controllable by setting up the capacity of a capacitor suitably free with this reserve irradiation equipment for focal detection.
[0005]
[Problem(s) to be Solved by the Invention] However, with the technique mentioned above, since light was emitted by the always same guide number, the contrast considered as a request by the height of the reflective brightness of a photographic subject was not acquired. Moreover, the problem that it is necessary to compensate the charge of the Maine capacitor in the intervals of luminescence, therefore release time lag increases when emitting light continuously is ******.
[0006] It is in the place which this invention was made in view of the above-mentioned problem, and is made into the purpose making free adjustable [of the luminescence quantity of light of a preliminary exposure] based on the reflective brightness of a photographic subject, and it not being based on photographic subject distance, but obtaining a good contrast output, preventing the remarkable release time lag in the case of emitting light continuously, and not being based on the charge electrical potential difference of the Maine capacitor, but emitting light by the desired guide number.
[0007]
[Means for Solving the Problem] In order to attain the above-mentioned purpose, in the reserve

irradiation equipment for focal detection of this invention The flash luminescence means which carries out the preliminary exposure of the photographic subject at the time of measurement, and the luminescence control means which controls luminescence at the time of the preliminary exposure of the above-mentioned flash luminescence means, A luminescence quantity of light setting means to set up the luminescence quantity of light of the above-mentioned flash luminescence means, and an optical on-the-strength distinction means to distinguish the optical reinforcement of the light of the above-mentioned photographic subject, It is characterized by having provided a detection means to detect the charge electrical potential difference of the above-mentioned flash luminescence means, having followed the output of the above-mentioned optical on-the-strength distinction means, and the output of the above-mentioned charge electrical-potential-difference detection means, and making free adjustable [of the luminescence quantity of light at the time of measurement].

[0008]

[Function] That is, a preliminary exposure is carried out in a photographic subject at the time of measurement, a luminescence control means controls luminescence at the time of the preliminary exposure of the above-mentioned flash luminescence means, a luminescence quantity of light setting means sets up the luminescence quantity of light of the above-mentioned flash luminescence means, an optical on-the-strength distinction means distinguishes the optical reinforcement of the light of the above-mentioned photographic subject, and a detection means detects [means / flash luminescence] the charge electrical potential difference of the above-mentioned flash luminescence means in the reserve irradiation equipment of this invention for focal detection. And the output of the above-mentioned optical on-the-strength distinction means and the output of the above-mentioned charge electrical-potential-difference detection means were followed, and it made free adjustable [of the luminescence quantity of light at the time of measurement].

[0009]

[Example] Hereafter, the example of this invention is explained with reference to a drawing. Drawing 1 is drawing showing the configuration of the control system of the reserve irradiation equipment for focal detection concerning one example of this invention. In this drawing, CPU1 performs serially the program beforehand memorized inside [ROM] un-illustrating, and controls a surrounding integrated circuit (IC) etc. And the TTL phase contrast detection method is adopted as automatic-focusing adjustment by the automatic focus (AF) IC 2. And photographic subject light passes a taking lens 28, if it reaches on photograph sensor array 24L arranged on the top face of AFIC2 concerned through the AF optical system 27 which consists of a condensing lens 26 and separator lenses 25L and 25R, and 24R, AFIC2 will process a quantity of light integral, quantization, etc. which are mentioned later, and the ranging information will be transmitted to CPU1 from AFIC2.

[0010] Furthermore, since exact ranging information cannot be acquired if dispersion is in the property of each component of the above-mentioned photograph sensor arrays 24L and 24R, and it remains as it is, in this example, the information about dispersion in the photograph sensor arrays 24L and 24R is beforehand memorized to EEPROM3 which is a non-volatile record component, and the amendment operation of the ranging information acquired from AFIC2 is performed in CPU1. That is, various operations can be performed by making this EEPROM3 memorize beforehand various adjustment values, such as mechanical dispersion and dispersion of the electrical characteristics of various components, and sending these adjustment value to it at CPU1 if needed. In addition, in this example, transfer of the above CPU 1 and the data between AFIC2 and EEPROM3 is performed by serial communication.

[0011] And the data bag 5 performs a copy lump of the date on a film based on the control signal outputted from CPU1. In addition, the data bag 5 concerned shall copy and the quantity of light of a lump lamp shall change with film ISO speed gradually. Furthermore, an interface (IF) IC 7 performs a 4-bit parallel communication link with CPU1, and generation of various constant voltages, such as waveform shaping of the output signal of measurement of photographic subject brightness, measurement of whenever [camera internal temperature], a photo interrupter, etc., constant voltage drive control of a motor, temperature stability, and an example electrical potential difference of a thermal ratio, the residue

check of a dc-battery, reception of infrared light remote control, control of Motor Driver 8 and ICs 9, control of various kinds LED, check of supply voltage, control of a booster circuit, etc. are performed.
[0012] And the silicon photodiode (SPD) 23 measures photographic subject brightness. The light-receiving side of this SPD23 is used as a part for a screen center section, and its circumference part 2 ****s, and performs two kinds of photometries with the spot photometry which measures the strength of the light in a part of middle of the screen, and the average photometry which measures the strength of the light using the whole screen. And if this SPD23 outputs the current according to photographic subject brightness to IFIC7, in IFIC7, the output from this SPD23 will be changed into an electrical potential difference, and it will transmit to CPU1. And in CPU1, exposure operation, decision of a backlight, etc. are performed based on the information on this electrical potential difference.
[0013] Furthermore, if the electrical potential difference which is proportional to absolute temperature by the circuit built in IFIC7 is outputted, A/D conversion of that signal will be carried out by CPU1, it will be outputted as a temperature measurement value of whenever [camera internal temperature], and this temperature measurement value will be used in a machine member, amendment of an electrical signal, etc. from which a condition changes with temperature. Moreover, waveform shaping of a photo interrupter etc. outputs the photocurrent of outputs, such as a photo interrupter or a photograph reflector, from IFIC7 as a square wave as compared with reference current. At this time, noise rejection is performed by giving a hysteresis to reference current. Moreover, reference current and a hysteresis characteristic can also be changed by the communication link with this CPU1. Furthermore, the residue check of a dc-battery is performed by pressuring partially the electrical potential difference of the dc-battery both ends when connecting low resistance to the both ends of a non-illustrated dc-battery, and passing a current in the IFIC7 interior, outputting to CPU1, performing A/D conversion within this CPU1, and obtaining A/D value.
[0014] And the infrared light modulated from LED21 for floodlighting of the unit 20 for remote control transmission is emitted, and reception of infrared light remote control performs the infrared light by receiving with the silicon photodiode 22 for light-receiving. And the output signal of this silicon photodiode 22 is transmitted to CPU1, after processing of waveform shaping etc. is performed in the IFIC7 interior. Moreover, if the supply voltage as which the exclusive terminal for it is prepared in IFIC7, and the low-battery monitor of supply voltage is inputted into this exclusive terminal falls from default value, a reset signal will be outputted to CPU1 from IFIC7, and the overrun of CPU1 etc. will be prevented beforehand. And control of a booster circuit operates a booster circuit, when supply voltage falls from a predetermined value.
[0015] Furthermore, LED currently used for LED19 for the display in a finder, such as AF ranging termination and stroboscope luminescence warning, or a photo interrupter is connected to the above IFIC7, ON / OFF of such LED, and control of the luminescence quantity of light communicate between CPU1 and EEPROM3, and IFIC7, and IFIC7 performs them directly. This IFIC7 also performs constant-voltage control of a motor. Furthermore, Motor Driver IC 8 performs the drive of three motors of the motor 13 for a lens drive (LD) for the shutter charge (SC) motor 12 which performs film feed and charge of a shutter, and focal adjustment, and the motor 14 for zooming (ZM) of a mirror frame and the drive of a booster circuit, the drive of LED for self-timer action indication, etc. And about "control of these actuation, for example, are driven ["which device is driven"]?, whether it reverses whether a motor is rotated normally", and whether "whether braking to be applied", in response to the signal from CPU1, IFIC7 carries out, when IFIC7 concerned controls Motor Driver IC 8.
[0016] And about whether the above-mentioned SC motor 12 is in shutter charge, film winding, and which condition of rewinding, it is detected by SCPI15 using a photo interrupter and a clutch lever, and the information concerned is transmitted to CPU1. Moreover, the amount of deliveries of a lens is detected by LDPI16 attached in the LD motor 13, and after the output is shaped in waveform by IFIC7, it is transmitted to CPU1. Furthermore, the amount of deliveries of zooming of a mirror frame is detected by ZMPI18 and ZMPR17. And when a mirror frame is between a TELE edge and a WIDE edge, it is made a configuration whose ZMPR17 gathers reflection of the silver seal stuck on the mirror frame. The output of this ZMPR17 is inputted into CPU1, and detection of a TELE edge and a WIDE

edge is performed.
[0017] Furthermore, ZMPI18 is attached in the ZM motor 14, after the output is shaped in waveform by IFIC7, it is inputted into CPU1 and the amount of zooming from a TELE edge or a WIDE edge is detected. And Motor Driver IC 9 drives the AV motor 10 which is a stepping motor for a diaphragm adjustment unit drive with the control signal from CPU1, AVPI11 shapes the output in waveform by IFIC7, and outputs it to CPU1, and detects a diaphragm open position. Moreover, the liquid crystal display panel 4 displays the number of film pieces, photography mode, stroboscope mode, a diaphragm value, a cell residue, etc. with the signal sent from CPU1. And at the time of photography or AF ranging, when the brightness of a photographic subject runs short, the stroboscope circuit 6 makes an arc tube emit light, and gives required brightness to a photographic subject, and based on the signal from CPU1, IFIC7 controls it.
[0018] And when it is in the condition, half-push [the release carbon button], first release switch R1SW serves as ON, and performs ranging actuation. Second release switch R2SW serves as ON, when it is in the condition, all push [the release carbon button], and photography actuation is performed based on various measured value. The zoom-in switch ZUSW and the zoom down switch ZDSW are switches which perform zooming of a mirror frame, and if ZUSW turns on and ZDSW turns on in the direction of a long focus, zooming of them will be carried out in the direction of a short focus.
[0019] Moreover, if the self switch SELFSW turns on, it will be in self-timer photography mode or the standby condition of remote control. If self-timer photography will be performed if R2SW is turned on in this condition, and the remote control transmitter 20 performs photography actuation, photography with remote control will be performed. And if the spot switch SPOTSW is turned on, it will become the "spot photometry mode" in which the strength of the light is measured in a part of center of a photography screen. This is the photometry by the below-mentioned AF sensor. In addition, as for the usual photometry in OFF, SPOTSW performs an evaluation photometry by SPD13 for a photometry. Furthermore, PCT1SW thru/or PCT4SW, and a program switch PSW are change-over switches in "program photography mode", and a photography person performs mode selection according to photography conditions. Moreover, a diaphragm and shutter speed are determined so that it may be turning on PCT1SW with a "portrait mode" and depth of field may become shallow by correct exposure within the limits.
[0020] And if PCT2SW is turned on, it will become "night view mode" and will usually be set as an one-step undershirt rather than the value of the correct exposure at the time of photography. And the value of a diaphragm and shutter speed is determined so that it may be turning on PCT3SW with "scenery mode" and depth of field may become as deep as possible by correct exposure within the limits. Furthermore, if PCT4SW is turned on, it will become a "macro mode" and will be used at the time of contiguity photography. In addition, these PCT1SW(s) thru/or two PCT4SW(s) or more cannot be chosen as coincidence.
[0021] Furthermore, PSW is the changeover switch in in the usual "program photography mode", is pushing the PSW concerned, and resets AV priority program mode which PCT1SW thru/or PCT4SW reset and mention later. Furthermore, if AV priority switch AVSW is turned on, photography mode will turn into "AV priority program mode." A photography person determines AV value and this mode determines shutter speed by the program according to that AV value. If it becomes this mode, the function of the above-mentioned [PCT2SW and PCT4SW] will be lost, and will serve as a configuration switch of AV value. Furthermore, PCT4SW is a switch which makes AV value small with the switch whose PCT2SW enlarges AV value.
[0022] Moreover, a strobe light switch STSW is a change-over switch in the luminescence mode of a stroboscope, and usually switches "automatic luminescence mode (AUTO)", "bloodshot-eyes mitigation automatic luminescence mode (AUTO-S)", "compulsive luminescence mode (FILL-IN)", and "the stroboscope off mode (OFF)." Moreover, a panorama switch (PANSW) serves as ON with a switch for a photography condition to usually detect photography in a panoramic exposure at the time of a panoramic exposure. And when photography mode is a panorama, the amendment operation of a photometry etc. is performed. Since the mask of a part of upper and lower sides of a photography screen will be carried out

at the time of a panoramic exposure and the mask of some photometry sensors will be carried out in connection with this, this is because an exact photometry cannot be performed.

[0023] Furthermore, the back lid switch BKSW is a switch which detects the condition of a back lid and which can be folded, and the condition that the back lid has closed turns into an OFF state. This BKSW will start loading of a film, if a condition shifts to OFF from ON. Moreover, the shutter charge switch SCSW is a switch for detecting shutter charge. Furthermore, the mirror rise switch MUSW serves as ON by mirror rise with the switch for detecting a mirror rise. And the DX switch DXSW is constituted from five non-illustrated switch groups by the switch for detecting the existence of film loading in order to read the DX code which shows the film speed currently printed by the cartridge of a film.

[0024] Next, drawing 2 is drawing showing the detailed configuration of the above AFIC12. In this drawing, the sensor control circuit SCC controls actuation of the AFIC2 whole according to the control signal from CPU1. When reset-signal AFRES from CPU1 is received, this sensor control circuit SCC supplies a reset signal to each block in AFIC2, and makes are recording actuation start. And during the are recording actuation, Signal AFEND is held to a low level "L", and it outputs to CPU1.

[0025] CPU1 is carrying out the monitor of the signal AFEND at any time, if the section which is a low level "L" exceeds integral limit time amount, will output Signal AFEXT and, as for the sensor control circuit SCC, will stop are recording actuation compulsorily according to this signal AFEXT. Furthermore, while the sensor control circuit SCC outputs Signals A and E to the sensor circuit SC and switching sensibility mode, it is the sensor data D (I) to CPU1 by Signals CLK and DATA. It communicates. In addition, although later mentioned about Photodiode PD and the sensor circuit SC, after ending are recording actuation, the are recording terminate signal TS is outputted to latch circuit LC and OR generating circuit ORC in the sensor circuit SC.

[0026] Moreover, are recording terminate signal TS of the sensor circuit SC which ended the charge storage first in the photo-electric-conversion element array It is inputted into the sensor control circuit SCC as a signal OR through OR generating circuit ORC, and this is outputted as a signal TOR in the sensor control circuit SCC (refer to TOR of drawing 4 (f)). Moreover, are recording terminate signal TS from the sensor circuit SC which finally ended the charge storage in the photo-electric-conversion element array Signal AFEND is outputted through the sensor control circuit SCC by the AND generating circuit ANDC (refer to drawing 4 (e)). It is the reset time TE about L section of the signal AFEND shown in this drawing 4 (e) by the following explanation. It calls.

[0027] And CPU1 detects high level"H" from the low level "L" of Signal AFEND, judges integral termination of AF sensor, measures the time amount of the low-level "L" section, and judges an integral limit. Furthermore, a clock pulse generator CG is the charge storage time TS. Sensor data D (I) The clock pulse CP for digitizing is generated, in drawing 4 , actuation is started to the input and coincidence of an AFRES signal, and the clock pulse CP to which the period increases like drawing 4 (g) with the passage of time is generated. Change of this period is the charge storage time TS. It has relation of an inverse proportion about the optical reinforcement which carries out incidence to Photodiode PD mostly.

[0028] And if the are recording terminate signal TS from the sensor circuit SC which completed the charge storage first in the optoelectric transducer is inputted into OR generating circuit ORC, Switch SW will be closed with Signal ORS. Counter COT starts the count of the clock pulse CP of a clock generator CG by ON of this switch SW.

[0029] Therefore, the counter output 0 is latched to latch circuit LC of the photodiode PD which received the strongest light in a photo-electric-conversion element array. And the charge storage time becomes long, so that the optical reinforcement which carries out incidence in other photodiodes is small, and it is the are recording terminate signal TS. Since time difference until it generates occurs, the counter output according to this time difference is latched in latch circuit LC, respectively.

[0030] Moreover, although OR generating circuit ORC is not illustrated, it confirms the are recording terminate signal TS from the sensor circuit SC corresponding to the photodiode located in central within the limits of a photo-electric-conversion element array. Since there is a possibility that the backlight of the main photographic subject background of the both sides of a photo-electric-conversion element array

may enter, here, it is the are recording terminate signal TS from the sensor circuit SC of each right-and-left predetermined number of this range. It excepts and has not inputted into OR generating circuit ORC.

[0031] Next, drawing 3 is drawing showing the still more detailed configuration of the sensor circuit SC in the above AFIC2. In this drawing, the sensor circuit SC switches a mode of operation according to photographic subject brightness, and when a photographic subject is low brightness, in high brightness, it sets it as "high sensitivity mode" at "low sensibility mode."

[0032] And first, in order to set the sensor control circuit SCC as "high sensitivity mode", it outputs signal A-E to the sensor circuit SC, and sets it as AS1 OFF, AS2 ON, AS3 ON, AS4 OFF, and AS5 ON. It is the are recording capacitor CI in this condition. Both ends short-circuit and are potential V2 by actuation of an operational amplifier AP. It is fixed and reset. Furthermore, for Photodiode PD, a cathode is the fixed potential Vr. It connects and the photocurrent according to the light-receiving quantity of light is generated. And the photocurrent corresponding [if AS3 is made off from ON, are recording actuation will be started, and] to the light-receiving quantity of light of Photodiode PD is the are recording capacitor CI. It flows in and the charge according to this is accumulated.

[0033] this, simultaneously output P2 of an operational amplifier AP potential -- reset potential V1 from -- it responded to the light-receiving quantity of light -- it inclines, comes out and descends (refer to drawing 4 (c)). And output P2 of an operational amplifier AP It is the predetermined potential V3 about a noninverting input edge. It connects with the reversal input edge of the fixed comparator CP, and is the output P2 of an operational amplifier AP. Potential V3 When it exceeds, it is the output P3 of Comparator CP. It is reversed from high level"H" to a low level "L", AS4 is minded, and it is the are recording terminate signal TS. It outputs. This are recording terminate signal TS The first signal is outputted as a signal TOR through the above-mentioned OR generating circuit ORC and the sensor control circuit SCC inside (refer to drawing 4 (f)).

[0034] Furthermore, are recording terminate signal TS The last signal is outputted as a signal AFEND through the AND generating circuit ANDC mentioned above and the sensor control circuit SCC inside (drawing 4 (e)). Moreover, when the shortest storage time in a photo-electric-conversion element array is shorter than predetermined time, it switches to "low sensibility mode" and are recording actuation is performed again (refer to drawing 5 (h) thru/or (m)). At the time of this "low sensibility mode", a setup of Signals A and E is performed by the sensor control circuit SCC, and it considers as AS1 ON, AS2 OFF, AS3 OFF, AS4 OFF, and AS5 ON by it. In addition, in low sensibility mode, an operational amplifier AP is a noninverting input edge V2 It is made to operate as a fixed comparator. And reversal input edge P1 of Comparator AP Potential V1 It is fixed and is a junction capacitance CJ. It has reset.

[0035] And it is the junction capacitance CJ of Photodiode PD by the photocurrent according to the light-receiving quantity of light which reverses Signal A, is made to turn off AS1, and Photodiode PD receives. Since it discharges, it is the reversal input edge P1 of Comparator AP. Potential is the reset potential V1. It goes up with the inclination according to the light-receiving quantity of light. Furthermore, a clock generator CG and Counter COT are reset with are recording initiation, and it is the reversal input edge P1 of Comparator AP. Potential is potential V2. When it exceeds, it is the output P2 of Comparator AP. It is reversed from high level"H" to a low level "L", AS5 is minded, and it is the are recording terminate signal TS. It outputs.

[0036] Moreover, are recording terminate signal TS from the sensor circuit SC which are recording ended early most like high sensitivity mode It responds, Switch SW is turned on through OR generating circuit ORC, and Signal TOR is outputted from the sensor control circuit SCC. And are recording terminate signal TS from the sensor circuit SC which are recording ended latest It responds and Signal AFEND is outputted from the sensor control circuit SCC through the AND generating circuit ANDC. Furthermore, the storage time [To] corresponding to the photodiode PD with the largest amount of incident light in a photo-electric-conversion element array, i.e., it is about the storage time which is equivalent to the above-mentioned signal TOR smallest, Counter output D latched in charge storage-time T (I) corresponding to the photodiode PD of the arbitration in a photo-electric-conversion element array, and corresponding latch circuit LC when it carries out (I) It has relation like a degree type.

[0037]
[Equation 1]

$$T(I) = \frac{T0 \times 16 \times 256}{16 \times 256 - 15 \times D(I)} \quad \cdots (1)$$

Counter output D digitized by transforming this formula (I) It is shown by the degree type.
[0038]
[Equation 2]

$$D(I) = 273 \cdot \left(1 - \frac{T0}{T(I)}\right) \quad \cdots (2)$$

[0039] In addition, charge storage-time T (I) Since it is proportional to the quantity of light which carries out incidence to each photodiode, it is Above D (I). A photographic subject picture signal can be acquired by reading. And Counter COT will stop a count, if 8 bits is counted. Therefore, the incident light reinforcement to Photodiode PD is above-mentioned charge storage-time T (I) weakly. The output of a component longer than the predetermined time decided by Above To is fixed to "255."
[0040] Next, drawing 6 is drawing showing the detailed configuration of the above-mentioned stroboscope circuit 6. In this drawing, DC to DC converter 52 which performs a pressure up is connected to juxtaposition until luminescence of a stroboscope is attained in supply voltage, and the Maine capacitor amplitude-measurement circuit 53 which measures the electrical potential difference charged by the Maine capacitor MC for the output of this DC to DC converter 52 is connected to the power source E. And the trigger circuit 54 which impresses the trigger for luminescence is connected to the Xe (xenon) tubing 57 at the output of above-mentioned DC to DC converter 52, and the Maine capacitor MC in which luminescence energy is further stored through diode D1 is connected. And the luminescence quantity of light control circuit 55 which controls the luminescence quantity of light of the Xe tubing 57 which consumes the energy of the Maine capacitor MC connected to the cathode of the above-mentioned diode D1, and emits light, and this Xe tubing 57 is connected to the serial, and the current supply control circuit 56 which controls supply of a power source E is connected to the power source E in the above-mentioned luminescence quantity of light control circuit 55. In addition, as for control of above-mentioned DC to DC converter 52, the Maine capacitor amplitude-measurement circuit 53, a trigger circuit 54, the luminescence quantity of light control circuit 55, and the current supply control circuit 56, the above CPU 1 is controlling IFIC7 as an interface.
[0041] Next, drawing 7 is drawing showing the configuration which embodied the above-mentioned stroboscope circuit 6 further. As shown in this drawing, resistance R1 and R2 is connected to the serial, as for the above-mentioned Maine capacitor amplitude-measurement circuit 53, the capacitor C1 is connected to this resistance R2 at juxtaposition, and the node of these resistance R1 and R2 has composition connected to the VST terminal of CPU1. and the electrical potential difference of the both ends of the resistance R2 which this Maine capacitor amplitude-measurement circuit 53 makes start DC to DC converter 52, and is generated in the division ratio of resistance R1 and R2 -- CPU1 -- a monitor -- carrying out -- the division-ratio twice of resistance by the electrical potential difference of the Maine capacitor MC -- the electrical potential difference of the Maine capacitor MC is measured by carrying out. In addition, a capacitor C1 is for carrying out smooth [of the measurement electrical potential difference].
[0042] As for the above-mentioned trigger circuit 54, resistance R3 and a thyristor D2 are connected to a serial. Between b-a of a capacitor C2 and the trigger coil T1 is connected to a serial between the anode of this thyristor D2, and GND. Similarly a capacitor C3 and resistance R4 are connected to a serial between the anode of a thyristor D2, and GND. It has the composition that secondary coil T1-c of the trigger coil T1 was connected to the outer wall of the Xe tubing 7, the node of a capacitor C3 and resistance R4 was connected to the cathode of the Xe tubing 57, and the gate of a thyristor D2 was connected to the STON terminal of CPU11. And this trigger circuit 54 impresses the negative Maine capacitor electrical potential difference to the cathode of the Xe tubing 57 at the same time it impresses a

trigger to the Xe tubing 57, and it is made to serve a double purpose also as a voltage doubler circuit for making luminescence of the Xe tubing 57 easy to carry out.
[0043] Here, actuation of this trigger circuit 54 is further explained to a detail. Carry out fixed time amount starting of DC to DC converter 52 first, and if sink charge is performed to capacitors C2 and C3 through resistance R3, the output charging current When this charged charge inputs a high level"H" signal into the gate of a thyristor D2, between the anode = cathode of a thyristor D2 flows. If a current flows from a capacitor C2 to a capacitor C2 between primary side a-b of a thyristor D2 and the trigger coil T1 and a current flows to a primary the trigger coil T1 side Since the flux linkage to the secondary coil of a primary coil arises in this trigger coil T1, induction of the high voltage is carried out to a secondary coil c terminal.
[0044] Furthermore, since a current flows from a capacitor C3 to a thyristor D2, resistance R4, and a capacitor C3 and the SANODO electrical potential difference of a thyristor D2 is set to 0V from the electrical-potential-difference value of the early Xe tubing 57 for which light can be emitted within an instant, The electrical potential difference by the side of the anode of the Xe tubing 57 of a capacitor C3 turns into an electrical potential difference of minus for which light can be Xe tubing emitted from 0V, the cathode electrical potential difference of the Xe tubing 57 is held by diode D3, and the voltage doubler circuit where the twice as many electrical potential difference for which light can be Xe tubing emitted as this will be impressed is driven in the both ends of the Xe tubing 57.
[0045] As for the above-mentioned luminescence quantity of light control circuit 55, diode D3 and the insulated-gate mold bipolar transistor IGBT1 are connected to a serial between the Xe tubing 57 and GND. The gate of this IGBT1 = Zener diode D4 is connected to juxtaposition between emitters. It has the composition that between the collector emitters of a transistor Tr1 was connected to juxtaposition, the current supply control circuit 56 was connected with the cathode of zener diode D4, and the base of a transistor Tr1 was connected to the STOFF terminal of CPU1 through resistance R6.
[0046] And this luminescence quantity of light control circuit 55 creates the gate voltage of the insulated-gate mold bipolar transistor IGBT1 with zener diode D4 with the electrical potential difference supplied from the current supply control circuit 56, and makes this IGBT1 an ON state. At this time, a luminescence current flows from the Xe tubing 57 to diodes D3 and IGBT1 by starting of a trigger circuit 54. And from CPU1, if a luminescence stop signal inputs into a STOFF terminal through resistance R6 at a transistor Tr1, a transistor Tr1 will operate, will make the gate charge of IGBT1 emit, will turn off IGBT1, and will stop a luminescence current.
[0047] The above-mentioned current supply control circuit 56 has the composition that a transistor Tr2 and resistance R5 were connected to the serial, resistance R7 and R8 and a transistor Tr3 were connected to the serial, and resistance R9 was connected to the G-ON terminal of CPU11. And an ON signal is inputted from the G-ON terminal of CPU1, if a transistor Tr3 starts this current supply control circuit 56 and a transistor Tr2 starts, it will supply the charge of the Maine capacitor MC to the luminescence quantity of light control circuit 55, and if an off signal is inputted, the supply of a charge to the luminescence quantity of light control circuit 55 will be suspended. In addition, in order to measure the electrical potential difference of the Maine capacitor MC, it performs by calling the subroutine of a charge electrical-potential-difference check, and the electrical-potential-difference value for which light can be emitted is beforehand stored in the storage region which is not illustrated in CPU1. In addition, the detail about this is mentioned later.
[0048] Next, with reference to the flow chart of drawing 8 , the sequence of the subroutine "first release" performed with the camera which applied this invention is explained to a detail. First, G-ON is made into high level"H" (step S101), and the subroutine "a charge electrical-potential-difference check" mentioned later is performed (step S102). Then, the subroutine "AF ranging" mentioned later is performed (step S103), and AF ranging result is undetectable or distinguishes with reference to a detection impossible flag (step S104).
[0049] And when AF ranging result can be detected, with reference to a fill-in flash flag, it distinguishes whether the fill-in flash was irradiated at the time of AF ranging (step S105). And a return is carried out, after distinguishing whether it is a focus with reference to a focus flag (step S107), and the LED display

in a finder and the pronunciation of a buzzer performing a focus display in a focus (step S108) and making G-ON into a low level "L" (step S112), when a fill-in flash is OFF.
[0050] On the other hand, in not focusing at step S107, the subroutine "a lens drive" mentioned later is performed, and a lens drive is carried out to it based on the result of the above-mentioned AF ranging (step S109). With reference to a focus flag, it distinguishes whether it is a focus (step S110), and a focus display will be performed if it is a focus (step S108). Then, in not focusing a fill-in flash flag -- referring to (step S113) -- a fill-in flash, when, and it branches to step S103, and it branches to step S102 in fill-in flash ON, it checks a charge electrical potential difference and fill-in flash luminescence is carried out again With a charge electrical potential difference, amendment is applied to luminescence time amount, it returns to step S103, and a subroutine "AF ranging" is performed again.
[0051] And when detection is impossible, after performing a non-focusing display [/ in / LED / a finder etc.] in step S111 in step S104, the return of G-ON is carried out and (step S112) carried out to a low level "L."
[0052] Here, when a fill-in flash exposure is performed at the time of AF ranging (i.e., when a fill-in flash is ON in the above-mentioned step S105), a quantity of light exaggerated flag and a quantity of light undershirt flag are referred to. And since there is no dependability in a ranging result when it is quantity of light over or a quantity of light undershirt, the return fill-in flash quantity of light is changed into step S103, and AF ranging is performed again. Moreover, when the quantity of light is proper, processing after step S107 is performed like the case of fill-in flash OFF.
[0053] Next, with reference to the flow chart of drawing 9 , the sequence of the subroutine "a charge electrical-potential-difference check" performed at step S102 of drawing 8 is explained to a detail. The electrical potential difference of the power source E in the stroboscope circuit 6 mentioned above is measured and memorized (step 201), and the temperature of a power source E is measured and memorized (step S202). And it decides on the time amount which performs Puri charge for an electrical-potential-difference check based on the result of the supply voltage and temperature of these steps S201 and S202 (step S203).
[0054] And a high level"H" signal is inputted from a STCHRG terminal, DC to DC converter 52 is started, and charge is started (step S204). Then, only the time amount on which it decided at the above-mentioned step S203 charges (step S205), from a VST terminal, A/D conversion of the electrical potential difference of the Maine capacitor MC is carried out, and its A/D value is memorized (step S206).
[0055] Furthermore, as compared with electrical-potential-difference A / [for which light can be emitted] D value beforehand memorized by EEPROM3 in A/D value measured at this step S206 (step S207), if a measurement electrical potential difference is high, it will progress to step S208 and the flag for which light can be emitted will be set, if a measurement electrical potential difference is low, it will progress to step S209 and the flag for which light can be emitted will be cleared. And a low-level "L" signal is inputted into a STCHRG terminal, and a stop (step S210) and this subroutine are ended for actuation of DC to DC converter 52 (step S211).
[0056] Next, with reference to the flow chart of drawing 10 , the sequence of the subroutine "AF ranging" performed at step S103 of drawing 8 is explained to a detail. First, at step S300 of drawing 10 , a subroutine "AF sensor integral" is performed and AF sensor integral by the photo-electric-conversion element arrays 24R and 24L in AFIC2 is performed. Here, the AF optical system 27 for carrying out image formation of the photographic subject image on this photo-electric-conversion element array 24R and 24L is explained. In addition, focal detection optical system which performs focus detection by re-image formation optical system dividing into two photographic subject images the photographic subject image formed with a taking lens 28, and detecting a location gap of re-image formation and its two photographic subject images on a photo-electric-conversion element array is already well-known.
[0057] The typical thing is constituted by the condensing lens 26 and the re-image formation lenses 25R and 25L of a pair which are located in about 122 image formation side of a taking lens 28 as shown in drawing 11 . And if the photographic subject image 123 carries out image formation on the above-mentioned image formation side 122 at the time of the focus of a taking lens 28, the reconstititution of

the photographic subject image 123 concerned will be carried out to an optical axis O on the secondary image formation side 127 of a perpendicular photo-electric-conversion element array with a condensing lens 26 and the re-image formation lenses 25R and 25L of a pair, and it will be set to 1st photographic subject image 123L and 2nd photographic subject image 123R. And re-image formation of the taking lens 28 is perpendicularly carried out to an optical axis O in the form where the photographic subject image 124 approached the optical axis O mutually when the photographic subject image 124 was formed ahead of a front focus 122, i.e., an image formation side, and it is set to 1st photographic subject image 124L and 2nd photographic subject image 124R. Moreover, when a taking lens 28 is formed behind rear focusing 122, i.e., the above-mentioned image formation side, at the photographic subject image 125, re-image formation of the photographic subject image 125 is perpendicularly carried out to the location mutually distant from the optical axis O to an optical axis O, and it is set to 1st photographic subject image 125L and 2nd photographic subject image 125R. The these 1st and 2nd photographic subject image has turned to the same direction, and the focus condition of a taking lens 28 can be detected including a front focus, rear focusing, etc. by detecting spacing of the part which corresponds mutually in both images.

[0058] Next, with reference to the flow chart of drawing 12 , the sequence of the subroutine "AF sensor integral" performed at step S300 of drawing 10 is explained to a detail. If it goes into this routine, it judges whether it is in stroboscope off mode first, and in being in stroboscope off mode, it will set up integral limit time amount the usual twice (2 and TL) (steps S400 and S401). Then, with reference to a flag, it judges whether AF sensor integral has started (step S402), and in not being [be / it] under integral, it starts an integral (step S403). To AFIC2, from CPU1, reset-signal AFRES is outputted and initiation of this integral is started.

[0059] It judges whether it is in fill-in flash mode in which shift to step S405 on the other hand when the integral has begun at step S402, and it finds the integral by irradiating a fill-in flash at a photographic subject (step S405). And in not being in fill-in flash mode, with reference to the integral termination output AFEND of the sensor control circuit SCC in AFIC2, it judges whether it shifted to step S410 and the integral was completed (step S407).

[0060] And when carrying out a return when this integral is completed, and having not ended, it judges whether it progressed to step S411 and integral limit time amount was reached. And when this reset time exceeds this integral limit time amount, it stops the integral control action of AFIC2 compulsorily (step S412). Moreover, when it is not over integral limit time amount, it repeats until it becomes integral termination or integral limit time amount to step S402 about the loop formation of return and steps S402, S405, S410, and S412. In addition, the reset time is stored in RAM by interrupt processing corresponding to an integral control circuit AFEND signal.

[0061] On the other hand, when it is in fill-in flash mode at the above-mentioned step S405, the subroutine "a fill-in flash exposure" which progresses to step S406 and is mentioned later is performed, and the pattern in fixed time amount performs a fill-in flash exposure. In addition, when an integral is completed during this fill-in flash exposure (AFEND signal), the reset time is incorporated by interrupt processing, and it stores in predetermined RAM. Furthermore, when the integral is not completed at step S407, in step S408, integral control action is stopped compulsorily, an integral limit flag is set up in step S409, after that, a return is carried out and an integral control action is ended (step S413).

[0062] In addition, since above-mentioned integral limit time amount is established in order to prevent that the reset time becomes long and time lag becomes large, when a photographic subject is low brightness, when a photographic subject is low brightness, a photographic subject picture signal may not be acquired correctly. Then, when the reset time exceeds a predetermined value, at the time of an integral, a fill-in flash is irradiated at a photographic subject, and lack of the photographic subject quantity of light is compensated next time. By the way, in the camera of this invention, it has the "stroboscope off mode" other than the usual "stroboscope low brightness automatic luminescence mode" as photography mode, and or speed light photography is forbidden, it is temporarily used at the time of photography in the location which is not desirable. In this case, the stroboscope light exposure as a fill-in flash was also forbidden, as shown in steps S400 and S401, the above-mentioned integral limit time

amount was set as coincidence twice, and degradation of the focal detection precision in low brightness is prevented.
[0063] Next, with reference to the flow chart of drawing 13 , the sequence of the subroutine "a fill-in flash exposure" by the stroboscope circuit 6 performed at step S406 of drawing 12 is explained to a detail.
[0064] If a subroutine "a fill-in flash exposure" is called, the count of luminescence in AF fill-in flash will be set up (step S501), and the below-mentioned subroutine "luminescence amendment" will be performed by A/D value of the above-mentioned charge electrical-potential-difference check (step S502).
[0065] This subroutine "luminescence amendment" applies amendment to luminescence time amount by A/D value outputted by the subroutine "a charge electrical-potential-difference check" as shown in drawing 14 . That is, when charge A / D value is smaller than #VOL1, only # N 2 shifts (step S520) and AGNO (step S521). And when charge A / D value is larger than #VOL1 (step S520), charge A / D value is compared with #VOL2 (step S522). And when charge A / D value is smaller than #VOL2, only # N 1 shifts AGNO (step S523). here -- comparison [with charge A / D value] # -- VOL1 and VOL2 have the relation of #VOL2>#VOL1. And this AGNO is equivalent to the table of drawing 23 , and #N1 and #N2 are equivalent to the shift amount on a table, and have the relation of #N2>#N1.
[0066] By the way, although the above-mentioned subroutine "luminescence amendment" is performed by shifting luminescence time amount, it is the same with amending the luminescence time amount itself. That is, as shown in drawing 15 , the table of luminescence time amount is chosen by A/D value shown by the charge electrical-potential-difference check subroutine. When charge A / D value is smaller than #VOL1 (step S550), the table data of AGNO are substituted from the table data of AFGNO (step S551). And when charge electrical-potential-difference A / D value is larger than #VOL1 (step S550), charge electrical-potential-difference A / D value is compared with #VOL2 (step S552). And when charge A / D value is smaller than #VOL2 (step S552), it is AFGNO about the table data of AFGNO. It substitutes from the table data of B (step S553), and when charge A / D value is larger than #VOL2, it is AFGNO about (step S552) and the table data of AFGNO. It substitutes from the table data of A. In addition, this AFGNO A-AFGNO The table data of the luminescence time amount to C are as being shown in drawing 16 .
[0067] In this way, if it returns to the sequence of a subroutine "a fill-in flash exposure", a subroutine "the Puri charge" will be performed next (step 503). The sequence of this subroutine "the Puri charge" is as being shown in drawing 17 . In addition, since this is the almost same contents as the SABURU routine "a charge electrical-potential-difference check" previously shown in drawing 9 , it omits explanation here.
[0068] Then, a subroutine "luminescence" is performed (step S504). The sequence of this subroutine "luminescence" is as being shown in drawing 18 . When it goes into this subroutine, the luminescence time amount for obtaining the need luminescence quantity of light is read (step S701), and a high level"H" signal is taken out and made to emit light from a STON terminal (step S702). And if only the time amount read at step S701 continues luminescence (step S703) and predetermined time passes, will progress to step S704, and input a high level"H" signal into a STOFF terminal, IGBT1 is made to turn off, and luminescence of the Xe tubing 57 is stopped. And a STON terminal is made into a low level "L" (step S705), a STOFF terminal is made into a low level "L" (step S706), and it progresses to return and step S505 by making STON and a STOFF terminal into an initial state at a SABURU routine "a charge electrical-potential-difference check." And a return will be carried out, if luminescence is continued and luminescence of the count of predetermined finishes until it defines the time amount of an interval (step S505) and the predetermined count of luminescence comes, in order to decide the period of AF fill-in flash (steps S506 and S507).
[0069] Next, sensor read-out actuation is performed in step S301 of drawing 10 . Namely, count output D latched to each latch circuit LC synchronizing with this if a clock is inputted into the CLK terminal of the sensor control circuit SCC in AFIC2 from CPU1 (I) A sequential output is carried out as sensor data at a DATA terminal, and CPU1 is this sensor data D (I). It stores in RAM which predetermined does not

illustrate one by one. And all sensor data D (I) Sensibility data DK of whether after reading is completed, the mode of operation of the sensor circuit SC is high sensitivity mode or low sensibility mode A communication link is also performed.
[0070] Then, at step S302 of drawing 10 , it is the sensor data D (I). The photometry value of a photographic subject is calculated by using. This photometry value is used for the judgment of the dependability of the obtained sensor data besides count of exposure data, or decision of the need for a fill-in flash etc. In addition, sensor data D (I) Charge storage-time T (I) Since it has the relation of the above-mentioned (1) formula, it is each sensor data D (I). Storage-time [of each component] T (I) A photometry value will be acquired if it asks.
[0071] On the other hand, it is the reset time TE. Sensor data D corresponding to this component since the amount of incident light to Photodiode PD is the storage time corresponding to fewest components as mentioned above (I) It is the maximum in [all] a component. Therefore, it is DMAX about this maximum sensor data. If it carries out, it is the reset time TE. A degree type can show with the application of the above-mentioned (1) formula.
[0072]
[Equation 3]

$$TE = \frac{T0 \times 16 \times 256}{16 \times 256 - 15 \times DMAX} \quad \cdots (3)$$

Therefore, [0073]
[Equation 4]

$$T0 = \frac{16 \times 256 - 15 \times DMAX}{16 \times 256} \cdot TE \quad \cdots (4)$$

It is the storage time To of a component with the largest amount of incident light to Photodiode PD in a next door and a photo-electric-conversion element array. It can ask. It is [0074] when this is substituted for the above-mentioned (1) formula.
[Equation 5]

$$T(I) = \frac{16 \times 256}{16 \times 256 - 15 \times D(I)} \cdot \frac{16 \times 256 - 15 \times DMAX}{16 \times 256} \cdot TE$$

$$= \frac{16 \times 256 - 15 \times DMAX}{16 \times 256 - 15 \times D(I)} \cdot TE \quad \cdots (5)$$

A next door, the reset time TE, and the maximum sensor data DMAX And each sensor data D (I) Storage-time [of each component] T (I) It is calculable.
[0075] When calculating a photometry value here, it is each sensor data D (I). Storage-time T called for (I) It is effective to use the average. Furthermore, if it asks about the component of the center section in a photo-electric-conversion element array, the part to which image formation of the photographic subject image is not carried out for a background etc. can be deleted. Moreover, what is necessary is just to calculate about one of photo-electric-conversion element array 24L or 24R, since the 1st and 2nd photographic subject images divided according to the above-mentioned AF optical system are equal. Therefore, the average storage time Tbar It is shown by the degree type.
[0076]
[Equation 6]

$$\overline{T} = \sum_{I=1}^{n} \frac{16 \times 256 - 15 \times DMAX}{16 \times 256 - 15 \times D(I)} \cdot \frac{TE}{n} \quad \cdots (6)$$

When this is approximated, it is shown like a degree type.
[0077]

[Equation 7]

$$\bar{T} \fallingdotseq \sum_{I=1}^{n} \frac{16\times 256-15\times DMAX}{16\times 256-15\times \sum_{I=1}^{n} D(I)} \cdot TE \quad \cdots (7)$$

Furthermore, this average storage time Tbar Logarithmic compression is carried out and the photometry value E is shown by the degree type.
[0078]
[Equation 8]

$$E = \log_2 \bar{T}$$
$$= \log_2 TE + \log_2 \left(\frac{16\times 256 \ -15\times DMA}{16\times 256 \ -15\times \Sigma D(I)} \right) + HE \cdots (8)$$

[0079] In addition, correction value HE The photometry value E and the reset time TE It is an adjustment value for amending relation, and the reset time over the homogeneity light source is measured, and EEPROM3 memorizes for every camera. This is because sensibility differs for every variation in optical system, or optoelectric transducer for every camera. Moreover, the high sensitivity mode and low sensibility mode of AFIC2 are correction value HE. Since it differs, it has each correction value.
[0080] By the way, at this example, it is the reset time TE. The time amount (refer to drawing 4 (f)) of L section of the TOR signal outputted from the TOR terminal of drawing 3 although the photometry value is calculated by using is measured, To =TOR is calculated, the above-mentioned (1) formula is applied, and it is storage-time [of each component] T (I). It calculates, and if it asks for average storage-time T' of an element number n further, it will become like a degree type.
[0081]
[Equation 9]

$$\bar{T}' \fallingdotseq \sum_{I=1}^{n} \frac{16\times 256}{16\times 256-15\times D(I)} \cdot T0$$

$$= \frac{16\times 256}{16\times 256-15\times \sum_{I=1}^{n} D(I)} \cdot T0 \quad \cdots (9)$$

Even if it applies this to the above-mentioned (8) formula, photometry value E' can be obtained similarly.
[0082]
[Equation 10]

$$E' = \log_2 T0 + \log_2 \left(\frac{16\times 256}{16\times 256-15\times \Sigma D(I)} \right) + HE' \quad \cdots (10)$$

[0083] Then, at step S303 of drawing 10 , when a subroutine "a fill-in flash judging" is performed and the quantity of light runs short by low brightness at the time of the integral of AFIC2, processing which sets up the judgment of whether it is necessary to turn on the fill-in flash which irradiates the auxiliary illumination light to a photographic subject, and the quantity of light of said fill-in flash is performed.
[0084] Hereafter, with reference to the flow chart of drawing 19 , the sequence of the subroutine "a fill-in flash judging" performed at step S303 of drawing 10 is explained to a detail. This integral was first performed to the beginning in high sensitivity mode, or it is the sensibility data DK. It refers to, and since photographic subject brightness is high enough at the time of low sensibility mode and a fill-in

flash is unnecessary, a return is carried out as it is (step S801). And when it distinguishes whether it progressed to the degree in high sensitivity mode, and the fill-in flash was irradiated at the time of this integral (step S802) and a fill-in flash is not irradiated, a fill-in flash judges that it is the need at the time of a next integral. Here, it is the reset time TE of AFIC2. A decision value Ts1 is compared and it is the reset time TE. When the direction is large, namely, when a photographic subject is low brightness, it is judged that a fill-in flash is required.

[0085] Then, flag F (Step S815) and the subroutine "AGNO initialization" mentioned later are performed at the time of AGNO=1, and it sets up the exposure quantity of light of a fill-in flash. The fill-in flash of this example is using stroboscope light, and sets up the AGNO (step S804). And the return of the fill-in flash demand flag is set and (step S805) carried out (step S814). Flag F AGNO is the initialization demand flag of the exposure quantity of light of a fill-in flash.

[0086] Here, the sequence at the time of irradiating a fill-in flash by this integral is explained. Since the sensor data which the reset time was short, namely, the photographic subject was located in point-blank range, or were outputted from AFIC2 when the exposure quantity of light of a fill-in flash was too large have very large variation and data with bad repeatability are easy to be obtained to a photographic subject image, the correlation result of an operation using this sensor data becomes what has low dependability.

[0087] For example, the storage time TS at the time of an integral while carrying out fill-in flash floodlighting at drawing 20 The relation of the are recording electrical potential difference VS is shown. The case where it is three, A, B, and C from which the amount of incident light to a photographic subject image optoelectric transducer serves as a ratio of 1:2:4, is shown in this drawing. Furthermore, the timing which irradiates stroboscope pulsed light periodic as a fill-in flash at a photographic subject, and the timing of Signal AFRES are also shown in drawing 17 (c) and (b). In addition, it considers [of explanation / C] as a component with the largest amount of incident light in all optoelectric transducers for convenience' sake.

[0088] It is the are recording judging electrical potential difference V3 to such an are recording wave. It can set up and the sensor data D (I) digitized when the above-mentioned (2) formula about the storage time TS (TSA, TSB, TSC of drawing 20 (f), (e), and (d)) and the above-mentioned quantization approach for it was applied can be computed. By the way, the sensor data D in fixed light mode when the above-mentioned amount of incident light has the ratio of 1:2:4, and when not irradiating a fill-in flash that is, (I) are D (I) by the formula (2), respectively. = it is set to 0,137,205 and this sensor data is the absolute value and the are recording judging electrical potential difference V3 of the amount of incident light. It does not change, unless an incident light quantitative ratio changes, even if it changes.

[0089] However, even if an incident light quantitative ratio does not change at the time of fill-in flash floodlighting, it is the sensor data D (I) by the above-mentioned conditions. It may be difficult to change and to recognize a photographic subject image correctly. That is, it is the are recording judging electrical potential difference V3 in order to simplify change of photographic subject brightness, i.e., change of the absolute value of the amount of incident light to an optoelectric transducer, in drawing 20 . It shall transpose to change and shall think.

[0090] Furthermore, drawing 21 is the are recording judging electrical potential difference V3. Sensor data DS of the optoelectric transducers B and C at the time of making it change It is the sensor data DS at the time of fixed light mode about change. It is drawing in which having considered as criteria and having shown the difference from it.

[0091] It is the sensor data D at the time of fill-in flash floodlighting (I) so that more clearly than this drawing. Error deltaDS Are recording judging electrical potential difference V3 Such a large value is shown that it is low. This is sensor data error deltaDS, so that the fill-in flash floodlighting quantity of light is so large that in other words a photographic subject reflection factor is large. Large and exact photographic subject image data cannot be obtained. Consequently, the precision of focal detection is made to fall remarkably.

[0092] Moreover, sensor data error deltaDS Storage time TS Since becoming large is also shown so that it is short, it is the storage time TS. By controlling to make focal detection precision fall similarly, when

short, to set up the suitable fill-in flash quantity of light in consideration of the reflection factor and distance of a photographic subject, and to become the suitable storage time, exact photographic subject image data can be obtained also at the time of fill-in flash floodlighting, and it can maintain focal detection precision. Therefore, the reset time TE When shorter than a predetermined value, it judges that it is unreliable, and the exposure quantity of light of a fill-in flash is lowered, and AF sensor integral is redone again.
[0093] Now, it sets to step 806 and is the reset time TE. The predetermined value TS 2 is compared and the 1st judgment is performed. And since it is not quantity of light over if it is reset-time TE >=TS2, a return is carried out, if it is reset-time TE <TS2, in order to judge that it is quantity of light over, to set a quantity of light exaggerated flag (step S807) and to lower the fill-in flash quantity of light, a predetermined number N is subtracted from AGNO, and it is newly referred to as AGNO (step S808).
[0094] Then, at step S809, when it is over the quantity of light control range shown in drawing 20 when this AGNO becomes smaller than "1" that is, it is located very much at a short distance, and since a photographic subject is a high reflection factor, it sets and (step S813) carries out the return of the detection impossible flag (step S814).
[0095] On the other hand, when it is AGNO>=1 in step S809, the 2nd judgment is performed at step S810. It is the reset time TE about the 2nd decision value TS 3 which becomes TS2>TS3 to the 1st above-mentioned decision value TS 2 here. It compares. This is for judging the case of the quantity of light over of the 2nd bigger level, and setting up the proper fill-in flash quantity of light AGNO more effectively. And if it is reset-time TE >=TS2, it is quantity of light over, but since it is the quantity of light over of the 1st level, a return is carried out as it is and above-mentioned AGNO=AGNO-N is saved. On the other hand, when it is reset-time TE <TS3, since it is the quantity of light over of the 2nd bigger level, in order to reduce the fill-in flash quantity of light further, from AGNO, a predetermined number M is subtracted and it is newly referred to as AGNO (step S811).
[0096] Then, at step S812, since it is over the quantity of light control range like the above-mentioned when this AGNO is smaller than "1", the return of the detection impossible flag is set and carried out (step S814). In addition, it is the reset time TE to the judgment of quantity of light over in this example. Although used, it is effective even if it judges using above-mentioned photometry value E, peak storage times TOR, and those combination.
[0097] Next, with reference to the flow chart of drawing 22 , the sequence of the subroutine "initialization of AGNO" performed at step S804 of drawing 19 is explained. In addition, this invention has the macro mode as photography mode, and if a macro mode SW is turned on by the photography person, it will be set as a macro mode.
[0098] It is confirmed whether the macro mode is first set up as photography mode (step S901). And since the photography person has the intention of photoing the photographic subject located in near in the case of a macro mode, corresponding to this, the fill-in flash quantity of light AGNO is set as a near photographic subject at proper comparatively small quantity of light AGNO=D (step S907).
[0099] On the other hand, in not being a macro mode, it progresses to step S902. And the quantity of light AGNO of a fill-in flash has the value beforehand decided according to the focal distance f of a taking lens set up (step S902). In addition, it is known for the taking lens (28-180mm) of a general focal distance that the photography scale factor of frequency is [1 / 40 - 1/60] the highest. Therefore, since photographic subject distance with high photography frequency is mostly determined according to a focal distance, the fill-in flash quantity of light AGNO doubled with this is initialized. In this example, a focal distance is divided into three fields and the respectively proper fill-in flash quantity of light is set up. That is, fill-in flash quantity of light AGNO=A which is most equivalent to the 1st focal distance field by the side of Wide first is set up (step S902).
[0100] And in step S903, it judges whether as compared with the 1st decision value ZP1, it is a field 1 about the value of the zoom pulse ZP from ZMPI60. And the return of the case of a field 1 is carried out as it is (step S908). And when it is not a field 1, suitable fill-in flash quantity of light AGNO=B for the field 2 which is a staging area is set up (step S904), and as compared with the zoom pulse ZP and the 2nd decision value ZP2, it judges similarly whether it is a field 2 (step S905). And a return is carried out,

after performing processing with the same said of a field 3 and setting it as fill-in flash quantity of light AGNO=C about a field 3 (step S906) (step S908).
[0101] In this example, although the initial value of the fill-in flash quantity of light AGNO is performed according to the focal distance of a taking lens, in addition even if it makes it change according to the f number of a taking lens, the above-mentioned photometry value E, the reset time TE, or the peak storage time TOR, the same effectiveness is acquired. Moreover, these combination may determine.
[0102] In addition, drawing 23 is drawing showing the number (1-12) of the fill-in flash quantity of light AGNO, and the table of the GNO value of AGNO. This divides even the maximum of the fill-in flash quantity of light AGNO proper for the longest photography distance and the photographic subject of a low reflection factor at the time of the speed light photography it is decided by Stroboscope GNO at the time of photography from the minimum value of the proper fill-in flash quantity of light AGNO that will be the shortest photography distance and the photographic subject of a high reflection factor of a camera. A suitable thing is chosen from these fill-in flash quantity of lights AGNO. In addition, on software, a number (1-12) is directed and AGNO is chosen.
[0103] Next, at step S304 of drawing 10 , with reference to a detection impossible flag, in the case of detection impossible, a non-focusing flag is set at step S319, and it ends the sequence of a subroutine "AF ranging." On the other hand, when detection is not impossible, a quantity of light exaggerated flag is referred to in step S305. And the return of the case of quantity of light over is carried out, AF ranging routine is again called through the Maine flow, and AF sensor integral is performed, carrying out the fill-in flash exposure of set-up AGNO. Furthermore, when it is not quantity of light over, it progresses to step S306 of the illumination distribution amendment to a degree.
[0104] And in illumination distribution amendment of this step S306, nonuniformity correction of the acquired photographic subject picture signal is performed. This is for amending the sensibility variation produced by the variation in the illuminance ununiformity on AF sensor side by the above-mentioned re-image formation optical system, the photodiode PD of a photo-electric-conversion element array, an are recording capacitor, etc. Sensor data D of each component to the homogeneity light source (I) EEPROM3 is made to memorize the calculated correction factor beforehand for every component, the above-mentioned correction factor is read for every photographic subject picture signal detection, and amendment count is performed for every component. This correction factor is called for as follows. namely, -- if it is the optoelectric-transducer output Do to the homogeneity light source (I) -- storage-time [of each component] T (I) It is shown by the degree type from the above-mentioned (1) type.
[0105]
[Equation 11]

$$T(I) = \frac{T0 \times 16 \times 256}{16 \times 256 - 15 \times D0(I)} \quad \cdots (11)$$

[0106] Here, it is To. It is the storage time of an optoelectric transducer with the largest amount of incident light in a photo-electric-conversion element array. The storage time of all components is [as opposed to / ideally / the homogeneity light source] To. Although it should become, variation arises by the above-mentioned factor in fact. It is each storage-time T (I) as the amendment approach. To It asks for a correction factor which is in agreement. Furthermore, it is H (I) about a correction factor. It becomes like a degree type using a formula (11).
[0107]
[Equation 12] And sensor data D before the amendment obtained by photographic subject picture signal detection (I) Above

$$H(I) = \frac{T(I)}{T0} = \frac{16 \times 256}{16 \times 256 - 15 \times D0(I)} \quad \cdots (12)$$

account correction factor H (I) After [amendment] sensor data D[to be used] ' (I) [** -- if it carries out -- 0108]
[Equation 13]

$$T'(I) = \frac{T(I)}{H(I)} \text{ であるから}$$

$$\frac{16\times256}{16\times256-15\times D'(I)} = \frac{16\times256}{16\times256-15\times D(I)}\cdot\frac{1}{H(I)}$$

$$D'(I) = \frac{16\times256}{15} - \frac{16\times256-15\times D(I)}{15}\cdot H(I) \quad \cdots (13)$$

It becomes.

[0109] This correction factor H (I) It is necessary to deform into the form which is easy to memorize to EEPROM3. The storage capacity of EEPROM3 is said correction factor H (I) in order to memorize a correction factor effectively within the limits of this, since it is restricted. Constants AS and BS It deforms like a degree type and compresses.

[0110]

[Equation 14]

$$H'(I) = \frac{16\times256}{16\times256-15\times D0(I)}\times AS - BS \cdots (14)$$

[0111] When variations, such as sensibility variation of AF sensor which contains the illuminance variation and the photo-electric-conversion element array on AF sensor side according actually determining a constant as one example to re-image formation optical system etc. hereafter, are assumed to be **15%, it is correction factor H (I). The range is as follows.

1 <= H (I) <= 1.15 -- on the other hand -- a limit of the memory capacity of EEPROM3 -- deformation correction factor H' (I) in order to store in 4 bits -- a constant AS and BS =104 -- then, it is good. In this case, [0112]

[Equation 15]

$$H'(I) = H(I)\times104-104$$

$$= \frac{16\times256}{16\times256-15\times D0(I)}\times104-104 \quad \cdots (15)$$

It can consider as a next door and the following range.

0 <= H' (I) <= The above-mentioned (13) formula is used for 15.6 pans, and it is H (I) from the above-mentioned (12) formula. When it eliminates, it is sensor data D[after amendment] ' (I). It is shown by the degree type.

[0113]

[Equation 16]

$$D'(I) = \frac{H'(I)+104}{104}\cdot D(I) - \frac{512}{195}\cdot H'(I) \quad \cdots (16)$$

Here, it is D' (I). It is a constant CS so that it may not be set to <0. It adds. For example, it is [0114] as CS =40.

[Equation 17]

$$D'(I) = \frac{H'(I)+104}{104} \cdot D(I) - \frac{512}{195} \cdot H'(I) + 40 \quad \cdots (17)$$

[0115] As mentioned above, (13) equations are correction factor H' (I). A formula and (15) equations are illumination distribution correction formulas. In addition, in a photo-electric-conversion element array, since the amount of incident light is small, it is the sensor data D (I). Since what is the limit 255 of quantization has not carried out photo electric conversion of the amount of incident light correctly, it does not perform illumination distribution amendment.
[0116] Next, at step S307 of drawing 10 , a subroutine "a correlation operation" is performed, two photographic subject images perform a correlation operation, and spacing of two images is detected. Here, the 1st photographic subject image is used as L image, and it is L (I) about the 1st photographic subject picture signal. It carries out. Moreover, the 2nd photographic subject image is used as R image, and it is R (I) about the 2nd photographic subject picture signal. It carries out. And I is set to 1, 2, 3, --, 64 by the component number at this example at the order of arrangement. That is, each element arrays 92L and 92R shall have 64 components each.
[0117] Hereafter, with reference to the flow chart of drawing 24 , the sequence of the subroutine "a correlation operation" performed at step S307 of drawing 10 is explained. "5", "37", and "8" are first set to Variables SL, SR, and J as initial value, respectively (steps S1001 and S1002). This SL is photographic subject picture signal L (I). It is the variable which memorizes the head number of the small block element array which carries out correlation detection from inside, and SR is photographic subject picture signal R (I). It is the variable which memorizes the head number of the small block element array which carries out correlation detection from inside, and J is photographic subject picture signal L (I). It is the variable which counts the count of migration of a small block. And correlation output F (S) It calculates by the degree type (step S1003).
[0118]
[Equation 18]

$$F(S) = \sum_{I=1}^{27} \{L(SL+I) + R(SR+I)\} \quad \cdots (18)$$

[0119] In this case, the element number of a small block is 27. The element number of a small block becomes settled with the magnitude of a ranging frame and the scale factor of detection optical system which were displayed on the finder. Then, correlation output F (S) The minimum value is detected. Namely, F (S) Fmin It compares and is F (S). Fmin It is Fmin if small. F (S) It substitutes and SL at that time and SR are memorized as SLM and an SRM (steps S1004 and S1005).
[0120] Furthermore, the decrement of the SR is carried out and the decrement of the J is carried out (step S1006). A correlation operation will be repeated if J is not "0" (step S1007). That is, the small block location in Image L is fixed, and correlation is taken, being able to shift one small block location in Image R at a time. And it is if J is set to "0." Next, 4 is added to SL, 3 is added to SR, and a correlation operation is continued (step S1008). That is, a correlation operation is repeated, being able to shift four small block locations in Image L at a time. A correlation operation will be ended if the value of SL is set to 29 (step S1009). By the above, a correlation operation can be performed efficiently and the minimum value of a correlation output can be detected. The location of the small block which shows the minimum value of this correlation output shows the physical relationship of a picture signal with the highest functionality. And most, in order to judge functionality about the detected high block picture signal of functionality, the correlation outputs FM and FP shown by the degree type are calculated (step S1010).
[0121]
[Equation 19]

$$FM=\sum_{I=1}^{27}\left|L(SLM+I)-R(SRM+I-1)\right| \quad \cdots (19)$$

$$FP=\sum_{I=1}^{27}\left|L(SLM+I)-R(SRM+I+1)\right| \quad \cdots (20)$$

[0122] That is, a correlation output when only **one element is able to be shifted to the small block location which shows the minimum correlation output about the photographic subject image R is calculated. At this time, FM, Fmin, and FP become relation as shown in drawing 25 (a) and (b). In addition, the axis of abscissa of drawing 25 (a) and (b) is the location of an optoelectric transducer, and the axis of ordinate shows the correlation output. Correlation output F (S) It is set to "0" in Point ZR. On the other hand, it is not set to "0" when functionality is low.
[0123] Then, in order to judge functionality, it asks for the functionality characteristics SK and FS shown in a degree type (step S1011).
At the time of FM>=FP SK=(FP+Fmin)/(FM-Fmin) -- (21) FS=FM-Fmin -- (22) At the time of FM<FP SK=(FM+Fmin)/(FP-Fmin) -- (23) FS=FP-Fmin -- (24)
The functionality characteristic SK is set to SK=1 when functionality is high, and when functionality is low, it is set to SK>1. Therefore, it can judge whether the amount of image gaps detected with the value of the functionality characteristic SK is reliable. Moreover, since the functionality characteristic FS is equivalent to the contrast of a small block picture signal with the highest functionality, a larger value shows that contrast is high.
[0124] Next, at step S308 of drawing 10 , in order to judge functionality, the above-mentioned functionality characteristics SK and FS are used. By the way, since the 1st and 2nd photographic subject image of the functionality characteristic SK does not correspond completely in fact according to the variation in optical system, the noise of an optoelectric transducer, a conversion error, etc., the functionality characteristic SK is not set to "1." Therefore, it judges using the predetermined decision value alpha. Moreover, the predetermined decision value beta is used about the functionality characteristic FS. That is, it is judged as those with functionality, and only in SK<=alpha and FS>=beta, it judges that he has no functionality in SK>alpha or FS<beta, judges that it is [AF detection] impossible, and it sets a detection impossible flag. Since these decision values alpha and beta use the decision value which there is variation by product each and changes with photography mode or AF modes of operation, they have been memorized to EEPROM3, respectively. And in with functionality, in S309, the amount of image gaps is calculated at this step S308.
[0125] here -- the spacing ZR of the 1st and 2nd photographic subject image -- So of drawing 25 (a) it is -- since -- the time of FM>=FP ZR=SRM-SLM+(FM-FP)/{(FM-Fmin) -2} -- (25)
At the time of FM<FP ZR=SRM-SLM+(FP-FM)/{(FP-Fmin) -2} -- (26)
It comes out.
[0126] Next, amount of image gaps deltaZR from a focus is shown by the degree type.
deltaZR=ZR-ZR0 -- (27)
However, ZR0 is the photographic subject image spacing at the time of a focus, and is memorized by EEPROM3 for every camera.
[0127] Next, in step S310 of drawing 10 , this amount of image gaps deltaZR is changed into amount of defocusing deltaDF. The amount of gaps of the image formation location to the film plane on an optical axis, i.e., amount of defocusing deltaDF, can be calculated by the degree type.
deltaDF=BD/(AD-deltaZR)-CD -- (28)
However, AD, BD, and CD It is the constant decided by AF optical system. It is indicated by JP,62-100718,A about this.
[0128] Next, aberration amendment is performed in step S311 of drawing 10 . That is, since the focusing point location of AF optical system shifts according to a focal distance and the delivery location of focusing under the effect of the spherical aberration of a taking lens 28, this is amended. This correction

value amends using the correction value memorized by EEPROM3 according to the focal distance and photographic subject distance of a taking lens 28.
[0129] Then, in step S312 of drawing 10 , release focus gap amendment processing which amends the focus gap at the time of exposure is performed. this predicts that an image formation location shifts at the time of photography narrowing-down actuation, it is amendment ******, and since it is indicated by the JP,4-30669,A official report for details, explanation here is omitted.
[0130] Then, in step S313 of drawing 10 , it judges whether detected amount of defocusing deltaDF is contained in focus tolerance. Focus tolerance is determined by depth of field, i.e., the drawing value at the time of photography, and the focal distance of a taking lens. Since fluctuation of the amount of detection defocusing is large when the focal distance of a low contrast photographic subject, a low brightness photographic subject, and the time of a fill-in flash exposure and a taking lens is long, focus tolerance is expanded and stabilization of AF actuation is achieved. When entering in focus tolerance, the return of the focus flag is set and carried out in step S315. In outside focus tolerance, the amount count of lens driving pulses is performed at step S314.
[0131] In addition, since the proposal of versatility [approach / of changing detected amount of defocusing deltaDF into amount of lens extraction deltaLK of the direction of an optical axis / former] is made, detailed explanation is omitted here. For example, it is asking by the degree type what is indicated by the JP,64-54409,A official report.
deltaLK=Aa-(Aa xBa)/(Aa+deltaDF)+calcium xdeltaDF -- (29) Here, they are Aa, Ba, and calcium. It is the constant memorized for every focal distance.
[0132] The focusing glass of a taking lens 28 is driven through a gear train from LDM13, and the movement magnitude of a focusing glass is inputted into IFIC7 by LDPI16 as an AFPI pulse. Therefore, it is shown by the degree type when the amount DP of lens driving pulses is calculated applying AFPI pulse number K per amount of unit deliveries to amount of lens deliveries deltaLK of the direction of an optical axis.
DP=Kxdelta LK -- (30)
In addition, each of amount of image gaps deltaZR(s) of (27) types and amount of defocusing deltaDFs of (28) types is signed values. And in a forward case, the direction which lets out a lens with rear focusing (it is image formation to the backside [a film plane]) is shown, and, in a negative case, the direction to which a lens is rounded with a front focus (it is image formation to a before [a film plane] side) is shown.
[0133] Then, it is confirmed whether when he had no functionality, in step S316, the fill-in flash exposure was performed with reference to the fill-in flash mode flag at the time of this AF sensor integral at step S308 of drawing 10 . In fill-in flash OFF, a non-focusing flag is set in step S319, and it ends the sequence of a subroutine "AF ranging."
[0134] On the other hand, in the case of a fill-in flash "ON", it shifts to step S317 and the sequence of a subroutine "an increment in the fill-in flash quantity of light" is performed. Hereafter, with reference to the flow chart of drawing 26 , the sequence of the subroutine "an increment in the fill-in flash quantity of light" performed in step S317 of drawing 11 is explained.
[0135] First, an integral limit flag is referred to and it is the reset time TE. Integral limit time amount TL It judges whether it exceeded (step S1101). In an integral limit here, possibility that proper photographic subject image data were not obtained and functionality was not acquired with lack of the fill-in flash quantity of light is high. In this case, a predetermined number L is added to the fill-in flash quantity of light AGNO, and it is newly referred to as AGNO (step S1102). This is for irradiating the fill-in flash quantity of light which increased at the time of a next fill-in flash mode sensor integral, and obtaining more proper photographic subject image data. Furthermore, it judges whether new AGNO is in a control range (step S1103). And since it is over the control range shown in drawing 20 in being AGNO>12, the return of the detection impossible flag is set and carried out in step S1104 (step S1105). In such a case, it is in "a photographic subject is located in a long distance", "a reflection factor being low", and the situation of "being very low brightness." On the other hand, since it is in a control range, the return of the case of AGNO<=12 is carried out soon.

[0136] In the above-mentioned step S1101, since possibility of being improved even if it makes the fill-in flash quantity of light increasing is low when it is not an integral limit, the return of the detection impossible flag is set and carried out in step S1104 (step S1105).
[0137] At this example, lack of the fill-in flash exposure quantity of light is distinguished by the judgment of being an integral limit. However, it is effective even if it uses and distinguishes a TOR signal (storage time of the component with the largest light-receiving quantity of light in a photo-electric-conversion element array) instead of being the reset time TE (storage time of the component with the smallest light-receiving quantity of light in a photo-electric-conversion element array). Moreover, you may judge using the above-mentioned photometry value E. Or more effective control is possible if it distinguishes in the combination of the reset times TE and TOR and the photometry value E.
[0138] Next, a detection impossible flag is referred to in step S318 of drawing 10 . And in the case of detection impossible, the return of the non-focusing flag is set and carried out at step S319. On the other hand, when detection is not impossible, a return is carried out as it is and AF ranging is again called in the Maine flow. And the drive of a taking lens 101 is performed based on the result of AF ranging of drawing 10 .
[0139] Hereafter, with reference to the flow chart of drawing 27 , the sequence of the subroutine "a lens drive" performed at step S109 of drawing 8 is explained. It judges whether the number of lens driving pulses first calculated by AF ranging processing is larger than a predetermined value (step S1201). The number of lens driving pulses which can surely carry out a lens drive to focus within the limits by one lens drive is used for this predetermined decision value. Here, it is considering for example, as 400 pulses.
[0140] And when the number of lens driving pulses is smaller than 400 pulses, it progresses to step S1202, when the backlash drive is already completed, or it distinguishes with a flag and the backlash drive is not yet completed, it progresses to step S1203, and it judges whether the lens driving direction is reversed with last time. And if it is the same direction as compared with the last lens driving direction, based on the number of lens driving pulses of AF ranging result, a lens drive will be performed at step S1204. Furthermore, the return of the focus flag is set up and carried out in step S1205. It is the number of driving pulses which surely focuses by one lens drive as mentioned above, and since lens driving directions are last time and identitas, backlash is considered as a focus, without carrying out AF ranging again, since it does not exist.
[0141] Then, it returns to step S1202 and judges in a backlash drive settled with reference to the flag driven [backlash]. And when finishing [backlash], it progresses to step S1204, and the return of the focus flag set is performed and carried out at a lens drive and step S1205. And it returns to step S1203, and when a lens driving direction is the reversal direction to last time, it progresses to step S1206 and the amount of backlash is calculated. Since this amount of backlash changes with the focal distances and driving directions of a taking lens, it carries out count according to them.
[0142] Then, at step S1207, only the number of lens driving pulses which is equivalent to the amount of backlash based on the calculated amount of backlash performs a lens drive. And at step S1208, the flag driven [backlash] is set and a return is carried out. In this case, AF ranging processing and lens drive processing are again performed on the Maine flow.
[0143] Next, when the number of lens driving pulses calculated by step S1201 by return AF ranging is 400 or more pulses, it progresses to step S1209, and from the above-mentioned lens driving pulse, a predetermined value is subtracted and it newly considers as a lens driving pulse. This predetermined value is correction value which shows a front location from a focusing point in a lens driving pulse, and is made into 200 pulses here, for example.
[0144] And a lens drive is performed based on the lens driving pulse by which amendment was carried out [above-mentioned] in step S1210. In this lens drive, even if backlash occurs, it will be removed by it. Furthermore, the return of the flag driven [backlash] is set and carried out at step S1211. Thereby, since a lens is in the location of 200 pulses with this side of a focusing point, and the number of driving pulses mostly, in the Maine flow, AF ranging and lens drive processing are called again, and it is

focusing.
[0145] Moreover, the above-mentioned correction value is set up so that the speediness of AF actuation related to the display of the finder which a camera does not illustrate may be given. For example, the case where repeat AF ranging and lens drive processing twice, and they are made to focus from the condition that the amount of defocusing is large is considered. Although the halt location of the 1st lens drive will be in a focus condition mostly in a finder by this side 50 pulse when comparatively close to a focusing point for example, it is in the condition in which it still ****ed out of the focus by this side 200 pulse. Also in the flume gap which performs the 2nd lens drive from this condition, it focuses, but speediness is acquired more for the direction which became a focus from pin dotage with the latter finder. Therefore, since the vanity of above-mentioned FINDA changes with the focal distances of a taking lens a lot, correction value has been changed according to this.
[0146] In the above, although the sequence of the subroutine "first release" performed in the camera which applied this invention was explained next, with reference to the flow chart of drawing 28 , the sequence of the subroutine "second release" performed in the camera which applied this invention is explained.
[0147] If second release R2SW is pushed and it goes into this subroutine, will make a G-ON terminal into high level"H", the current supply control circuit 56 "will be made to turn on", and a charge will be supplied to the gate terminal of IGBT1 (step S1301). And a subroutine "bloodshot-eyes luminescence" is performed (step S1302).
[0148] It is as the sequence of the subroutine "bloodshot-eyes mitigation luminescence" by this stroboscope circuit 16 being shown in the flow chart of drawing 29 . That is, except that the time amount of the sequence of the subroutine "a fill-in flash exposure" which described this subroutine previously, and the count of luminescence of step S1401 and the interval of step S1404 differs somewhat, actuation is the same and the luminescence quantity of light in step 1403 is also set up beforehand.
[0149] Then, a mirror rise is performed (step S1303), and when luminescence of a stroboscope is required, it progresses to step S1305, and when luminescence of a stroboscope is unnecessary, it progresses to step S1308 (step S1304). Then, the subroutine "the Puri charge" mentioned above is performed (step S1305). And after step S1305 is completed, a point curtain is started (step S1306), and the subroutine "luminescence" mentioned above after this point curtain was completed is performed (step S1307).
[0150] On the other hand, it progresses to step S1309, after starting a point curtain (step S1308), when stroboscope luminescence becomes unnecessary in the above-mentioned step S1304. And a back curtain is started, exposure is ended (step S1309), a mirror is brought down (step S1310), and a shutter is charged, it considers as an initial state (step S1311), a film is wound up (step S1312), the "L" signal is inputted into a G-ON terminal (step S1313), supply of power to the gate of IGBT1 is forbidden, and photography is ended (step S1314).
[0151] As explained in full detail above, since it is not based on the charge electrical potential difference of the Maine capacitor but preliminary lighting is performed by the desired luminescence guide number, release time lag can be reduced by this invention.
[0152]
[Effect of the Invention] The reserve irradiation equipment for focal detection which made it possible according to this invention to make free adjustable [of the luminescence quantity of light of a preliminary exposure] based on the reflective brightness of a photographic subject, and for it not to be based on photographic subject distance, but to obtain a good contrast output, to prevent the remarkable release time lag in the case of emitting light continuously, and not to be based on the charge electrical potential difference of the Maine capacitor, but to emit light by the desired guide number can be offered.

[Translation done.]

* NOTICES *

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is drawing showing the configuration of the control system of the reserve irradiation equipment for focal detection concerning one example of this invention.
[Drawing 2] It is drawing showing the detailed configuration of AFIC2.
[Drawing 3] It is drawing showing the detailed configuration of the sensor circuit SC in AFIC2.
[Drawing 4] It is a timing diagram for explaining actuation of AFIC2.
[Drawing 5] It is a timing diagram for explaining actuation of AFIC2.
[Drawing 6] It is drawing showing the detailed configuration of the stroboscope circuit 6.
[Drawing 7] It is drawing showing the still more detailed configuration of the stroboscope circuit 6.
[Drawing 8] It is the flow chart which shows the sequence of the subroutine "first release" performed with the camera which applied this invention.
[Drawing 9] It is the flow chart which shows the sequence of the subroutine "a charge electrical-potential-difference check" performed at step S102 of drawing 8 .
[Drawing 10] It is the flow chart which shows the sequence of the subroutine "AF ranging" performed at step S103 of drawing 8 .
[Drawing 11] It is drawing showing the configuration of the AF optical system 27 for carrying out image formation of the photographic subject image on photo-electric-conversion element array 24R and 24L.
[Drawing 12] It is the flow chart which shows the sequence of the subroutine "AF sensor integral" performed at step S300 of drawing 10 .
[Drawing 13] It is the flow chart which shows the sequence of the subroutine "a fill-in flash exposure" by the stroboscope circuit 6 performed at step S406 of drawing 12 .
[Drawing 14] It is the flow chart which shows the sequence of the subroutine "luminescence amendment" performed at step S502 of drawing 13 .
[Drawing 15] It is the flow chart which shows the sequence of the example of amelioration of the subroutine "luminescence amendment" performed at step S502 of drawing 13 .
[Drawing 16] It is drawing showing the table which chooses luminescence time amount by charge A / D value.
[Drawing 17] It is the flow chart which shows the sequence of the subroutine "the Puri charge" performed at step S503 of drawing 13 .
[Drawing 18] It is the flow chart which shows the sequence of the subroutine "luminescence" performed at step S504 of drawing 13 .
[Drawing 19] It is the flow chart which shows the sequence of the subroutine "a fill-in flash judging" performed at step S303 of drawing 10 .
[Drawing 20] The storage time TS at the time of an integral while carrying out fill-in flash floodlighting Are recording electrical potential difference VS It is drawing showing relation.
[Drawing 21] Are recording judging electrical potential difference V3 It is the sensor data DS at the time of fixed light mode about change of the sensor data DS of the optoelectric transducers B and C at the

time of making it change. It is drawing in which having considered as criteria and having shown the difference from it.
[Drawing 22] It is the flow chart which shows the sequence of the subroutine "initialization of AGNO" performed at step S804 of drawing 19 .
[Drawing 23] It is drawing showing the number (1-12) of the fill-in flash quantity of light AGNO, and the table of the GNO value of AGNO.
[Drawing 24] It is the flow chart which shows the sequence of the subroutine "a correlation operation" performed at step S307 of drawing 10 .
[Drawing 25] It is drawing showing the relation between the location of an optoelectric transducer, and a correlation output value.
[Drawing 26] It is the flow chart which shows the sequence of the subroutine "an increment in the fill-in flash quantity of light" performed in step S317 of drawing 10 .
[Drawing 27] It is the flow chart which shows the sequence of the subroutine "a lens drive" performed at step S109 of drawing 8 .
[Drawing 28] It is the flow chart which shows the sequence of the subroutine "second release" performed in the camera which applied this invention.
[Drawing 29] It is the flow chart which shows the sequence of the subroutine "bloodshot-eyes mitigation luminescence" performed at step S1302 of drawing 28 .
[Description of Notations]
1 [-- Liquid crystal display panel,] -- CPU, 2 -- AFIC, 3 -- EEPROM, 4 5 [-- Motor Driver IC] -- A data bag, 6 -- A stroboscope unit, 7 -- 8 IFIC, 9 10 -- AV motor, 11 -- AVPI, 12 -- Shutter charge motor, 13 -- The motor for a lens drive, 14 -- The motor for zooming, 15 -- SCPI, 16 [-- LED for the display in a finder,] -- LDPI, 17 -- ZMPR, 18 -- ZMPI, 19 20 [-- A photograph sensor array, 25L, 25R / -- A separator lens, 26 / -- A condensing lens, 27 / -- AF optical system, 28 / -- Taking lens.] -- The unit for remote control transmission, 21 -- 22 LED for floodlighting, 23 -- A silicon photodiode, 24L, 24R

[Translation done.]

* NOTICES *

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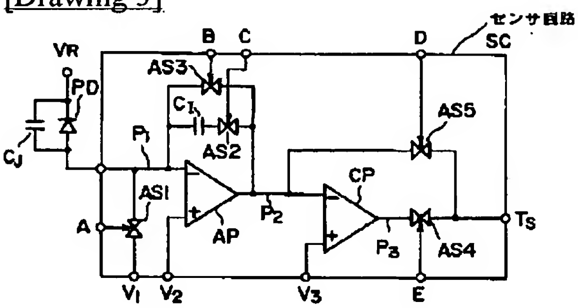
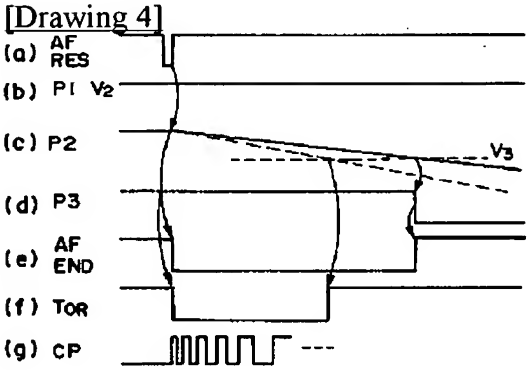
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

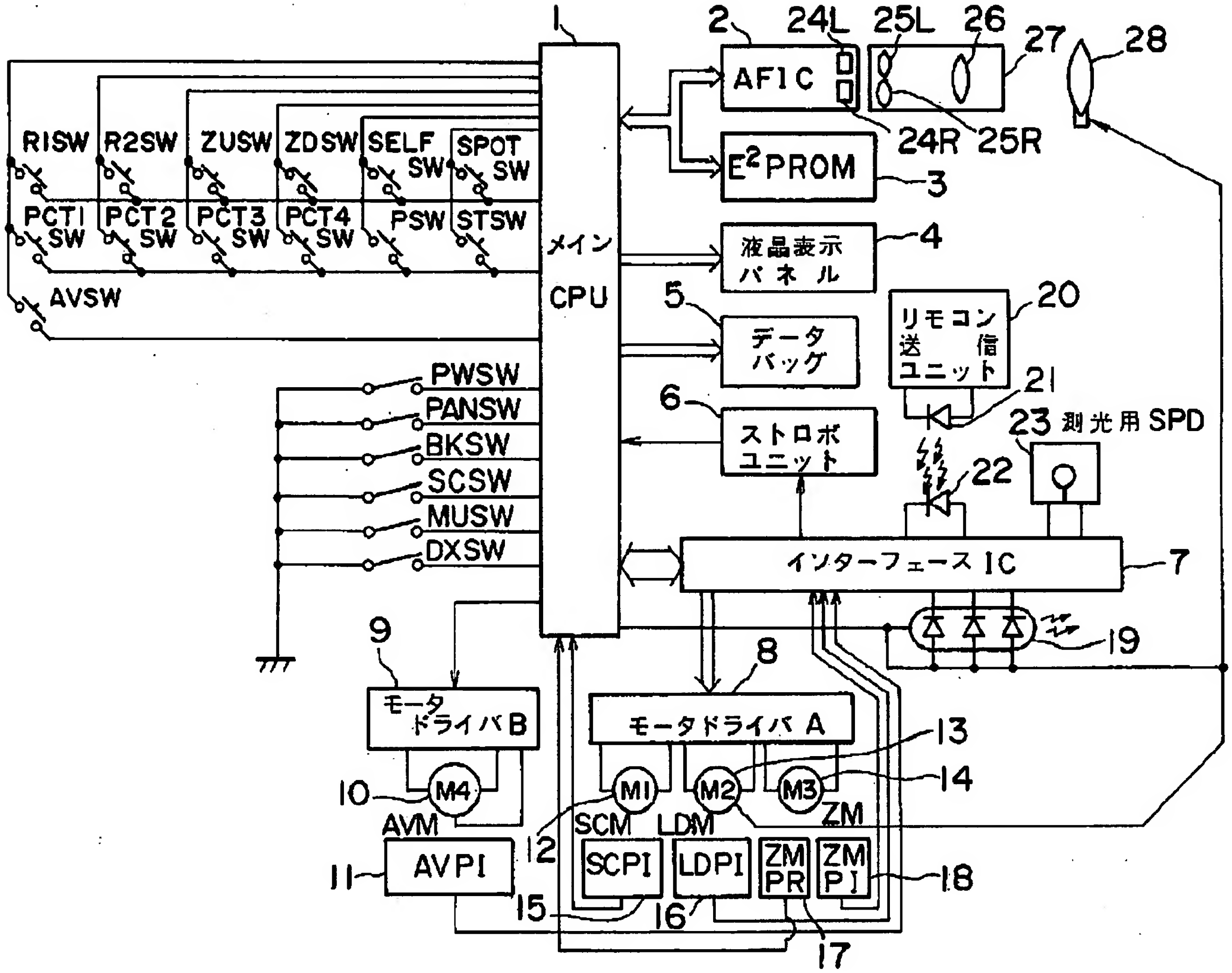
[Drawing 3]



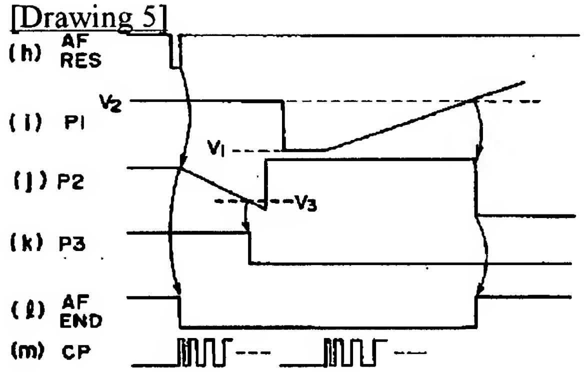
[Drawing 4]



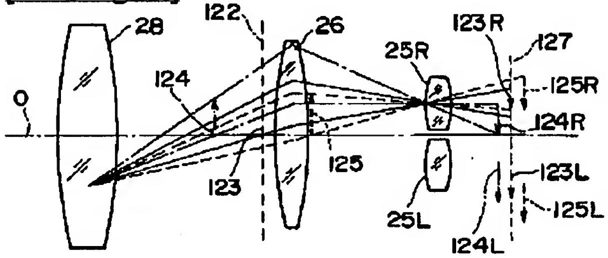
[Drawing 1]



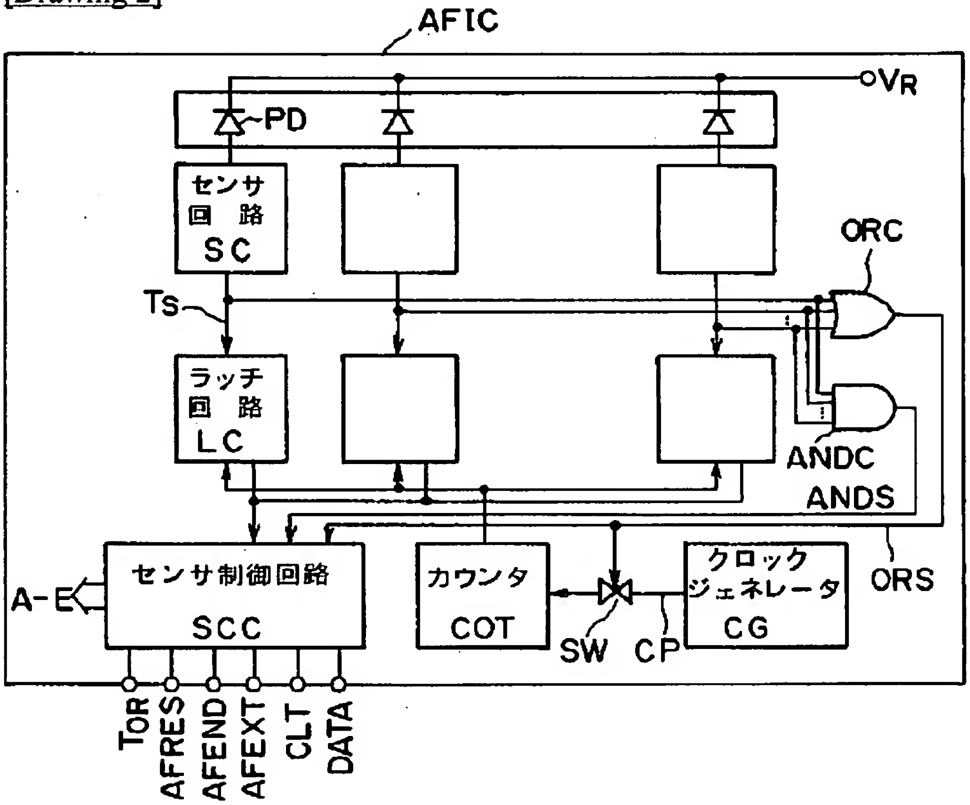
[Drawing 5]



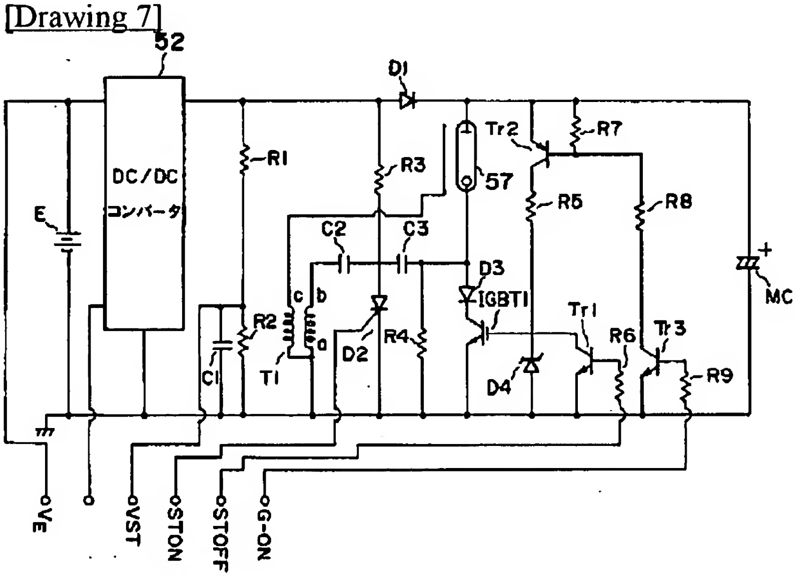
[Drawing 11]



[Drawing 2]



[Drawing 7]



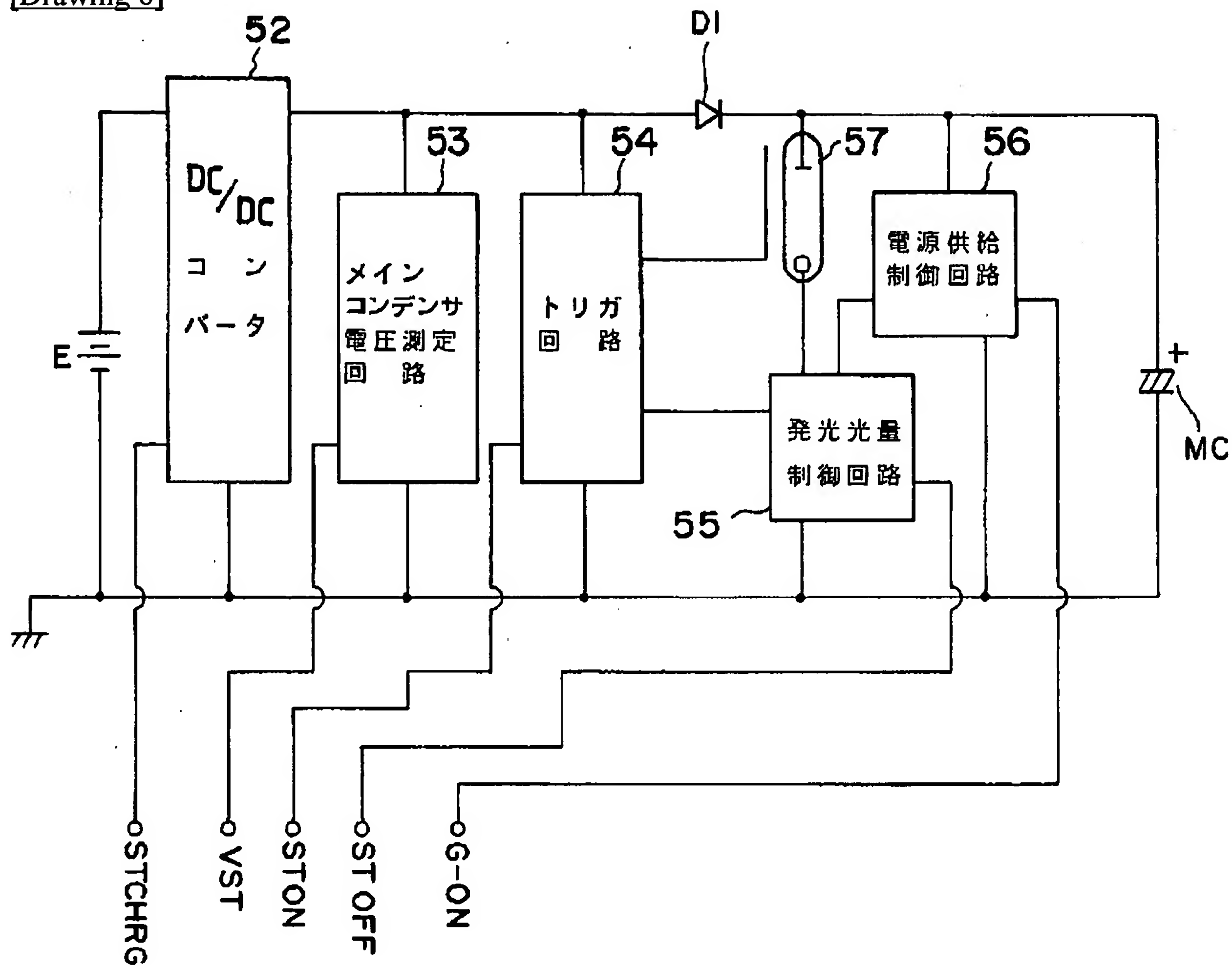
[Drawing 16]

AFGNO	AFGNOA	AFGNOB	AFGNOC
1	3	4	5
2	4	5	6
3	5	6	7
4	6	7	8
5	7	8	10
6	8	9	12
7	9	11	14
8	10	13	16
9	12	15	18
10	14	17	21
11	16	19	24
12	18	21	27

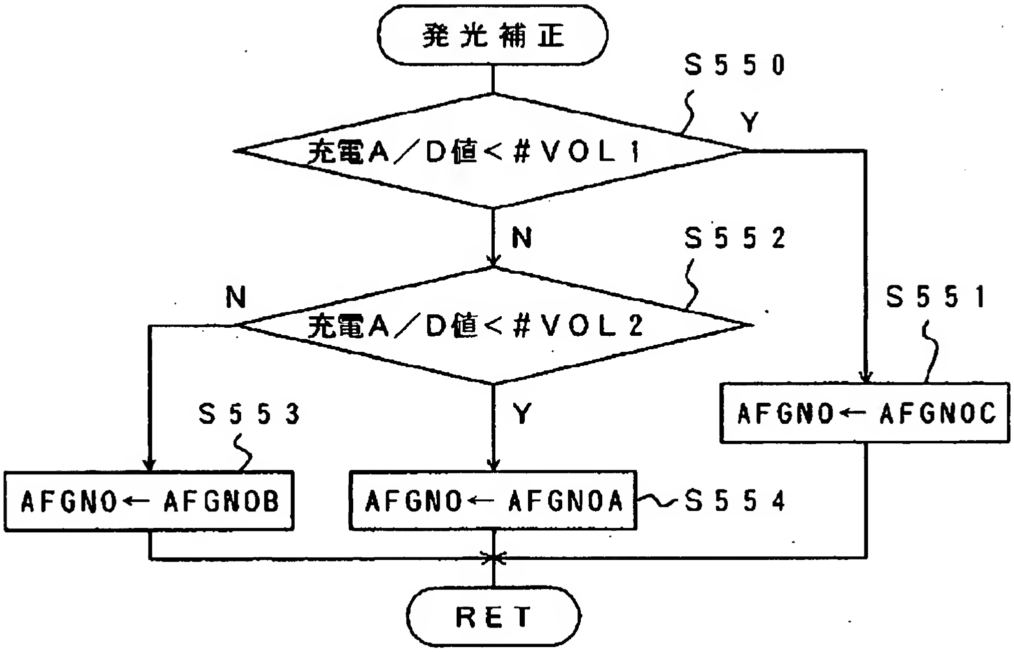
[Drawing 23]

	(AGMO) NO	GNO値
	1	0.02
D→	2	0.05
	3	0.09
A→	4	0.16
	5	0.26
	6	0.36
B→	7	0.49
	8	0.60
	9	0.81
C→	10	1.05
	11	1.22
	12	1.42

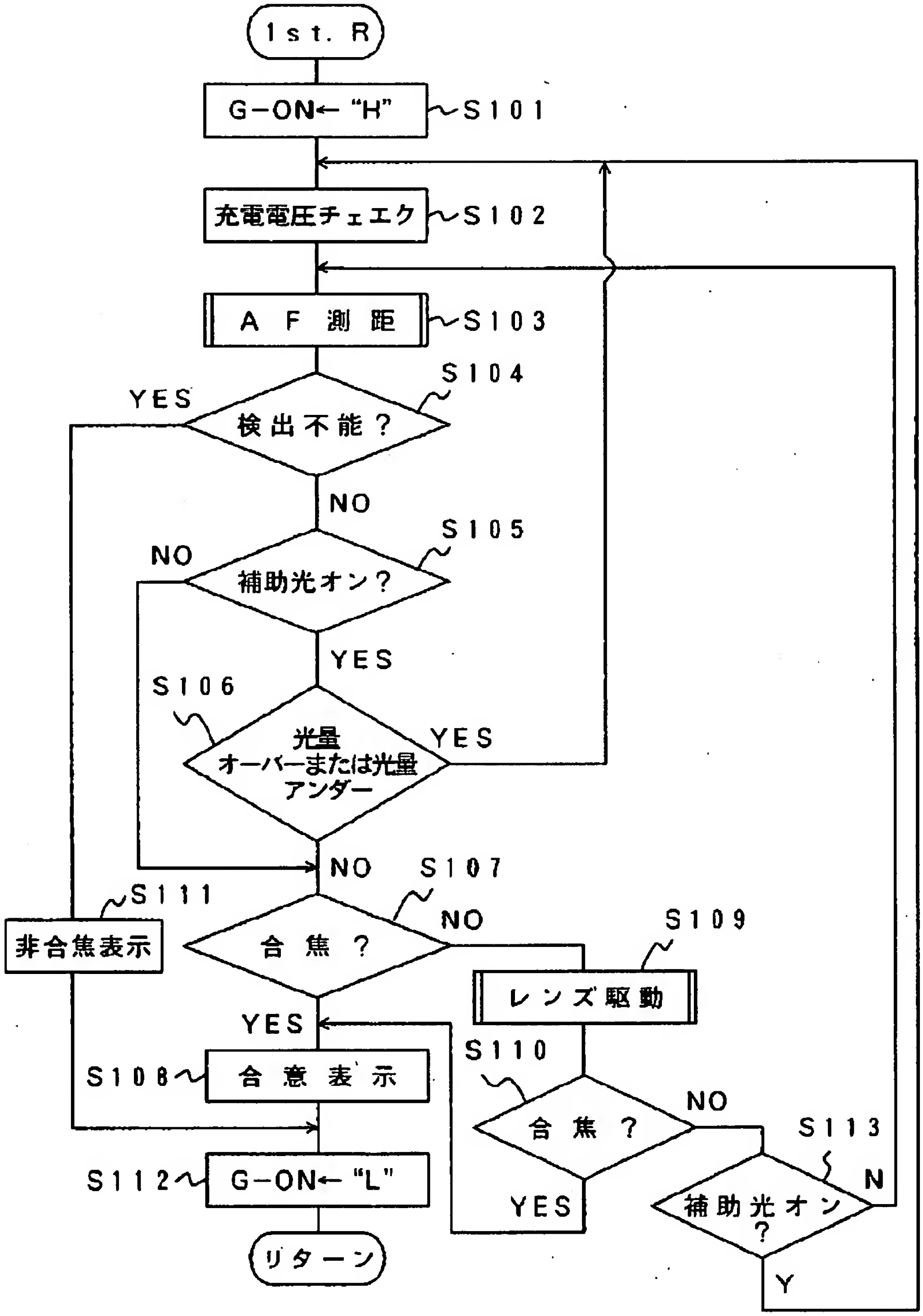
[Drawing 6]



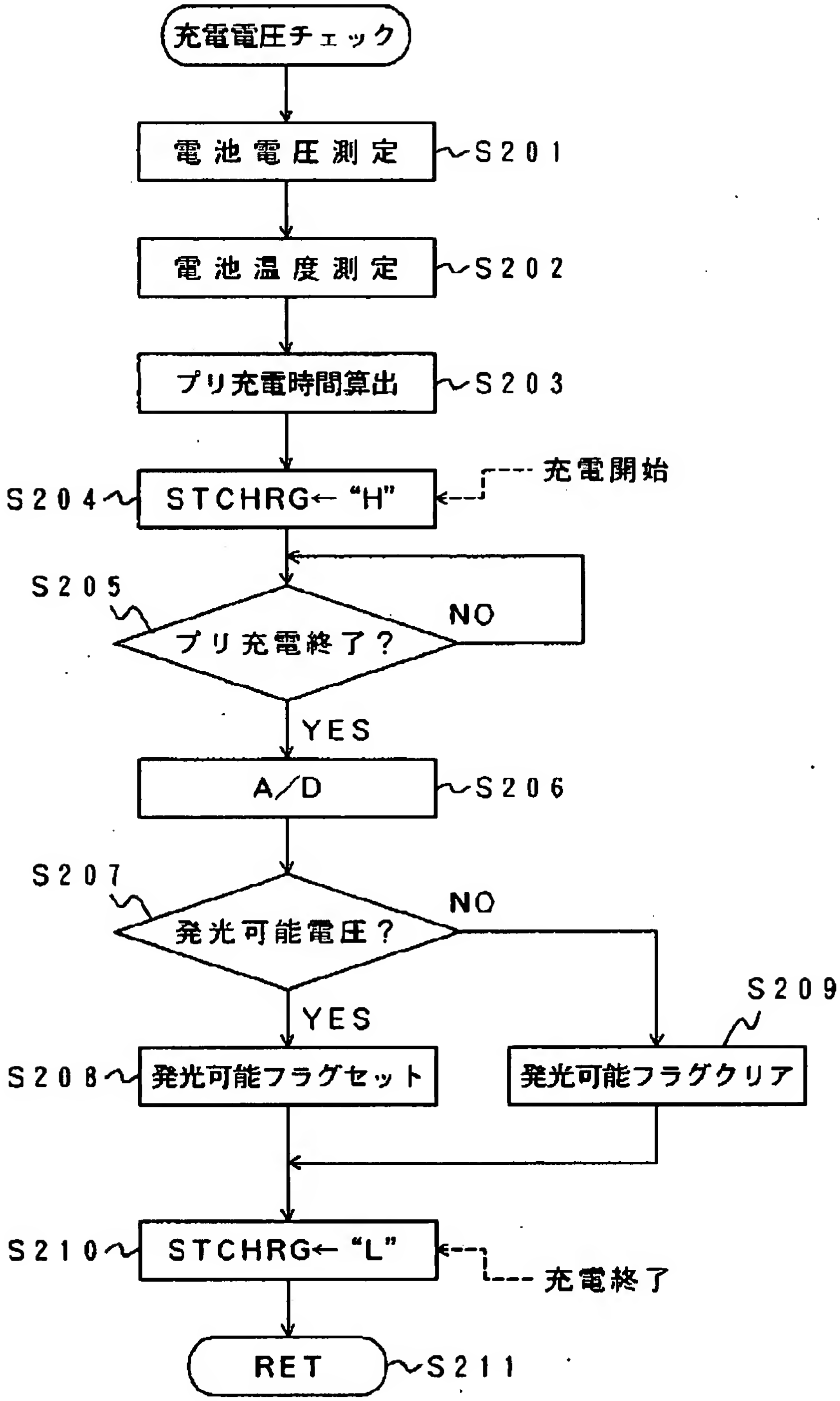
[Drawing 15]


発光補正
S550
充電A／D値＜#VOL1
Y
N
S552
N
充電A／D値＜#VOL2
S551
AFGNO← AFGNOC
S553
Y
AFGNO← AFGNOB
AFGNO← AFGNOA
S554
RET

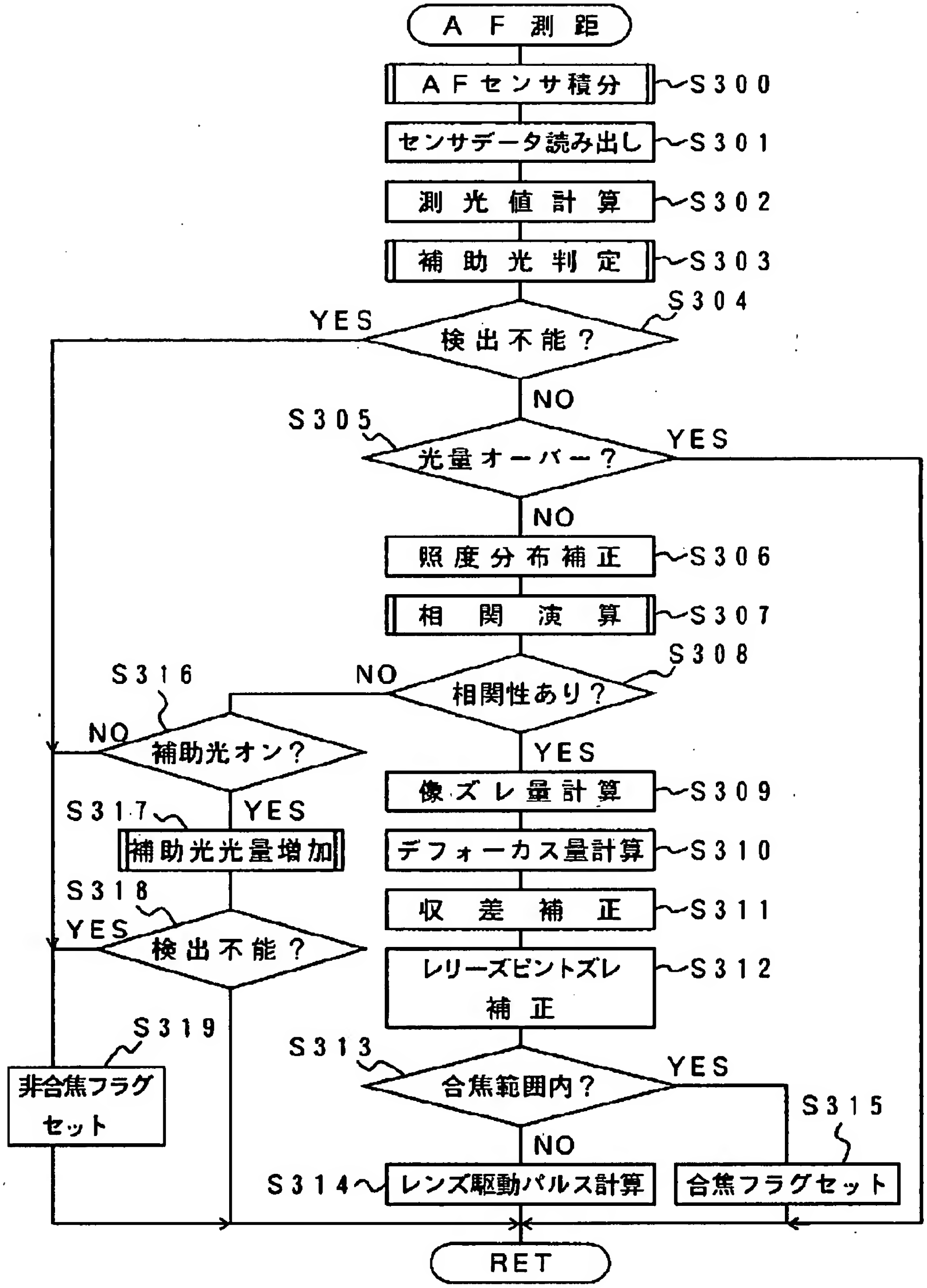
[Drawing 8]


1st. R
G−ON← "H"
S101
充電電圧チェエク
S102
AF測距
S103
S104
YES
検出不能？
NO
S105
NO
補助光オン？
YES
S106
光量オーバーまたは光量アンダー
YES
NO
S107
S111
非合焦表示
NO
合焦？
S109
レンズ駆動
YES
S110
S108
合意表示
合焦？
NO
S113
N
S112
G−ON← "L"
YES
補助光オン？
リターン
Y

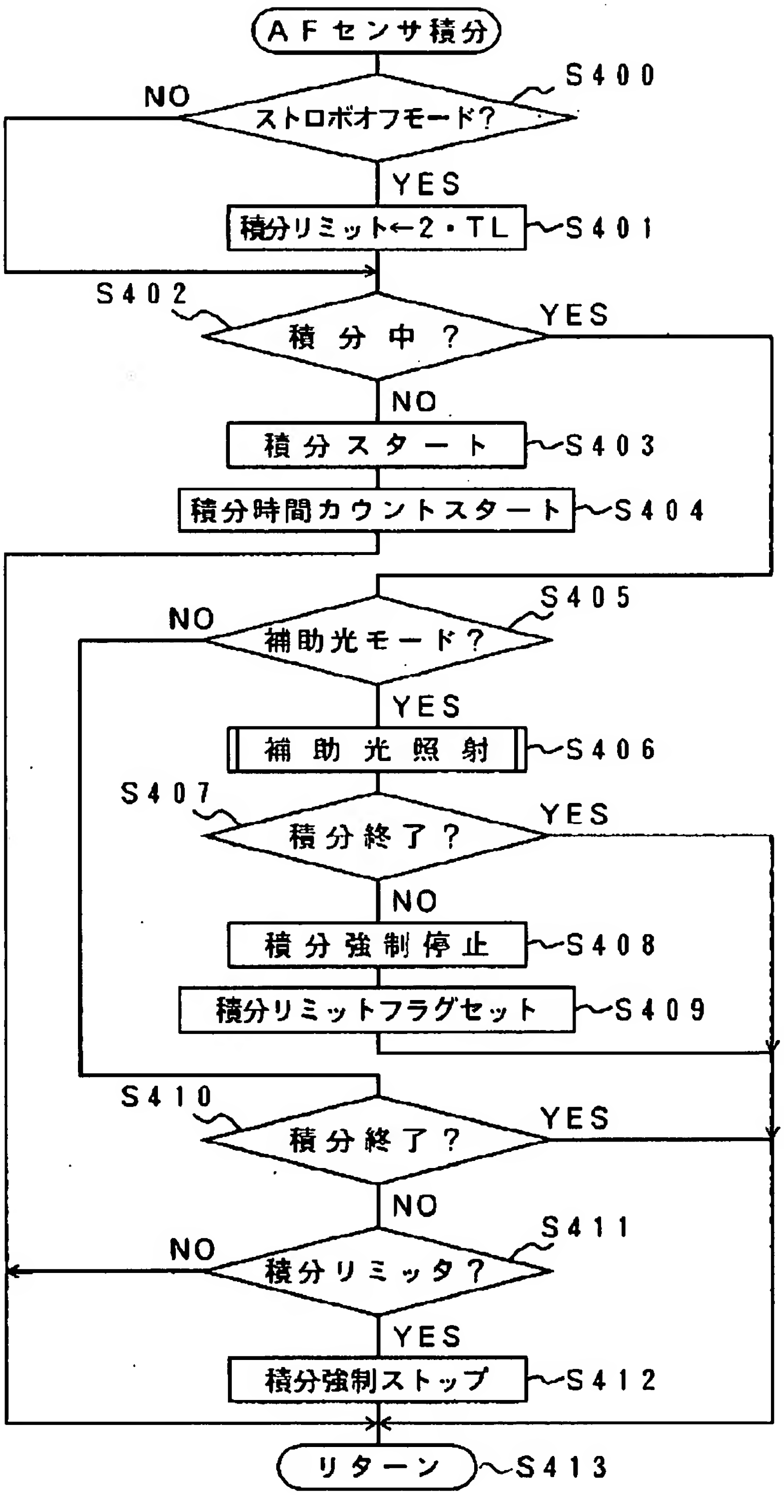
[Drawing 9]


充電電圧チェック
電池電圧測定
S201
電池温度測定
S202
プリ充電時間算出
S203
S204
STCHRG← "H"
充電開始
S205
プリ充電終了？
NO
YES
A/D
S206
S207
発光可能電圧？
NO
YES
S209
S208
発光可能フラグセット
発光可能フラグクリア
S210
STCHRG← "L"
充電終了
RET
S211

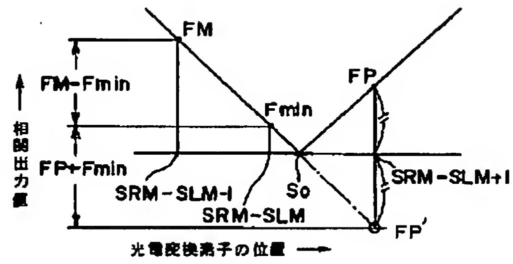
[Drawing 10]


AF測距
AFセンサ積分
S300
センサデータ読み出し
S301
測光値計算
S302
補助光判定
S303
S304
検出不能？
YES
NO
S305
光量オーバー？
YES
NO
照度分布補正
S306
相関演算
S307
S308
相関性あり？
NO
YES
S316
補助光オン？
NO
YES
S317
補助光光量増加
S318
検出不能？
YES
S319
非合焦フラグセット
像ズレ量計算
S309
デフォーカス量計算
S310
収差補正
S311
レリーズピントズレ補正
S312
S313
合焦範囲内？
YES
NO
S314
レンズ駆動パルス計算
S315
合焦フラグセット
RET

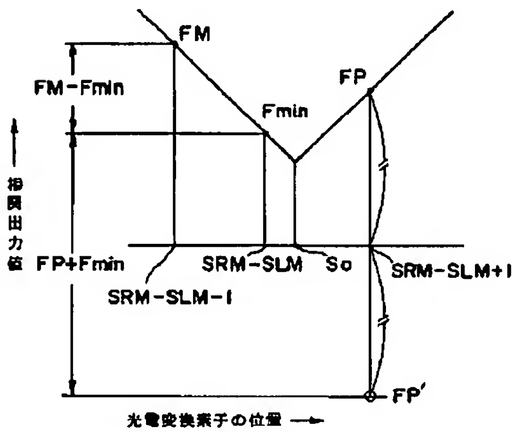
[Drawing 12]


ＡＦセンサ積分
S400
ストロボオフモード？
NO
YES
積分リミット←2・TL
S401
S402
積分中？
YES
NO
積分スタート
S403
積分時間カウントスタート
S404
S405
補助光モード？
NO
YES
補助光照射
S406
S407
積分終了？
YES
NO
積分強制停止
S408
積分リミットフラグセット
S409
S410
積分終了？
YES
NO
S411
積分リミッタ？
NO
YES
積分強制ストップ
S412
リターン
S413

[Drawing 25]

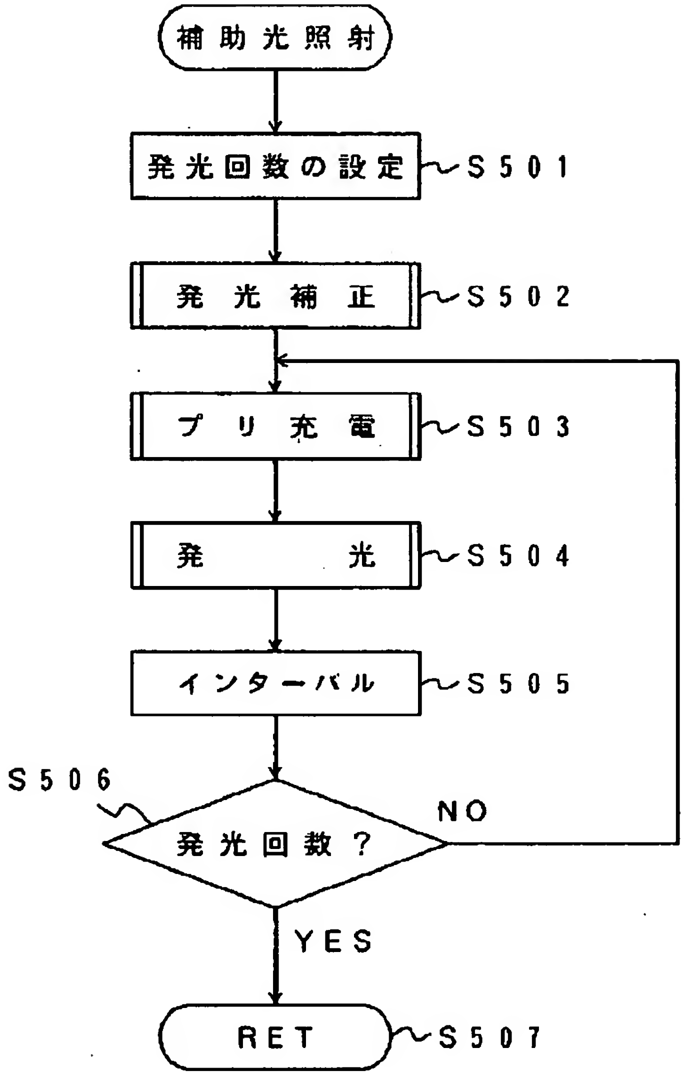


(a)

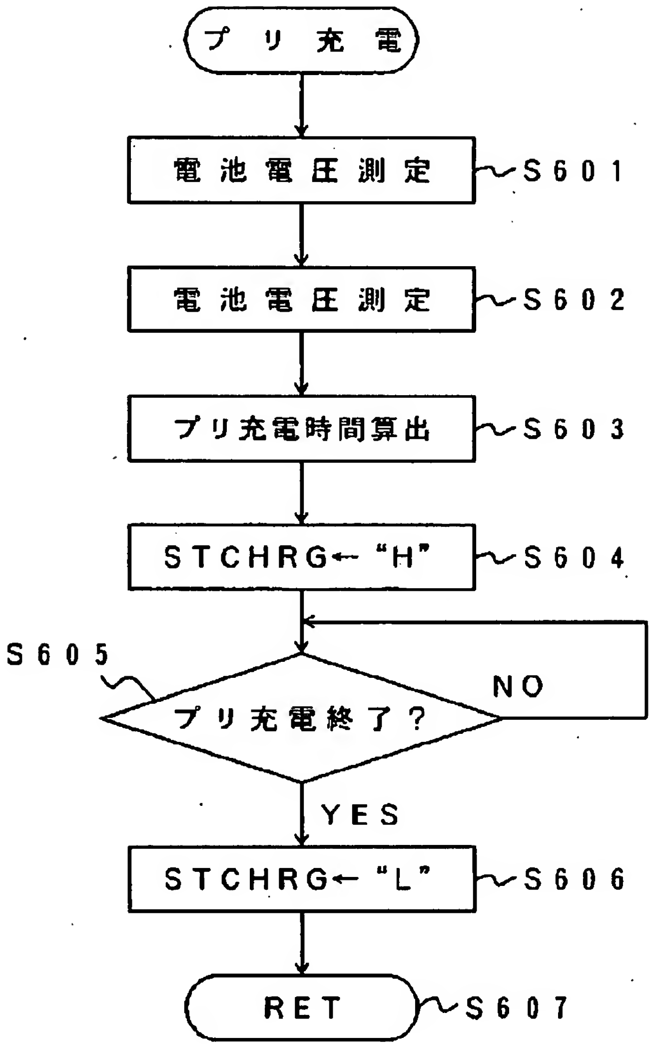


(b)

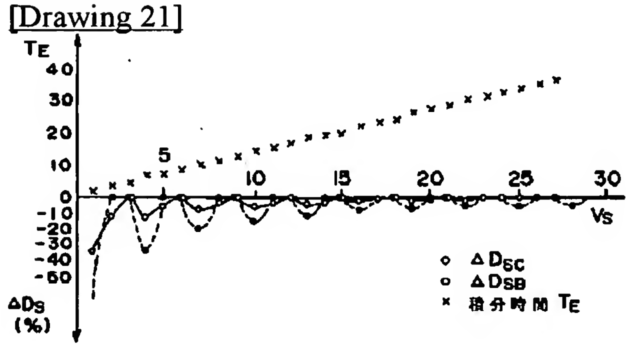
[Drawing 13]


補助光照射
発光回数の設定
S501
発光補正
S502
プリ充電
S503
発光
S504
インターバル
S505
S506
発光回数？
NO
YES
RET
S507

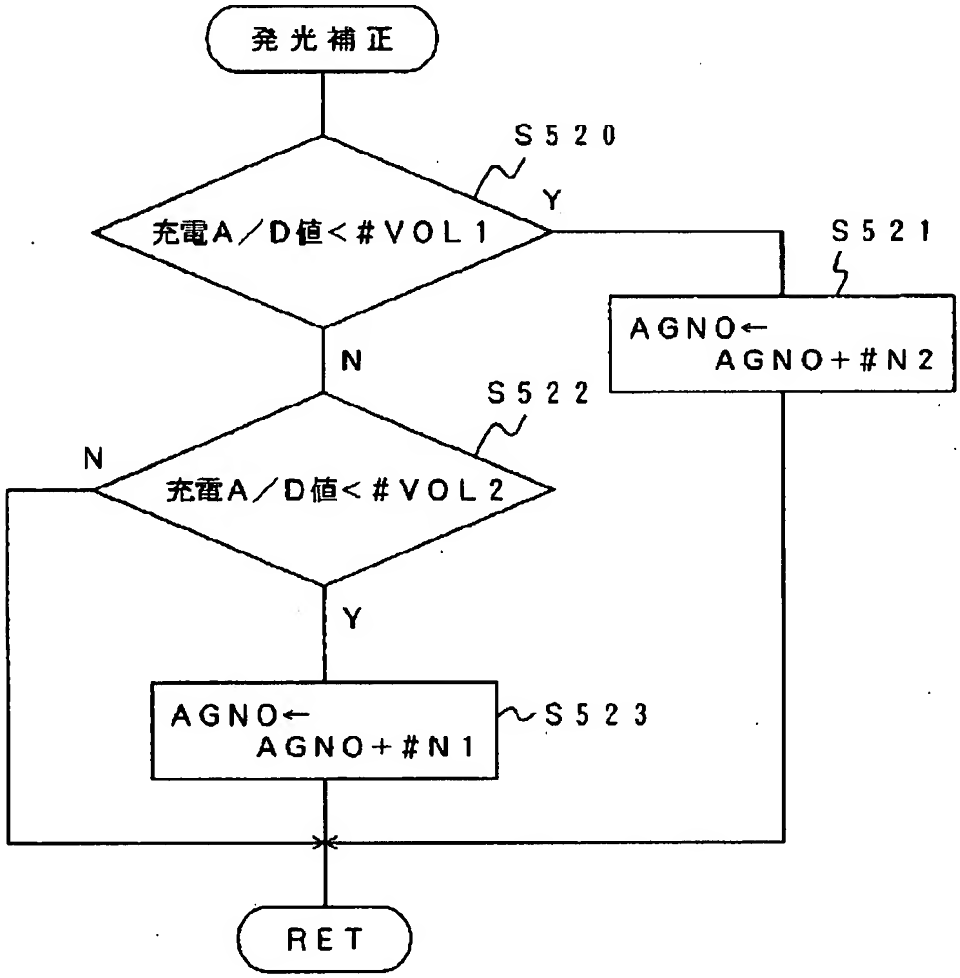
[Drawing 17]



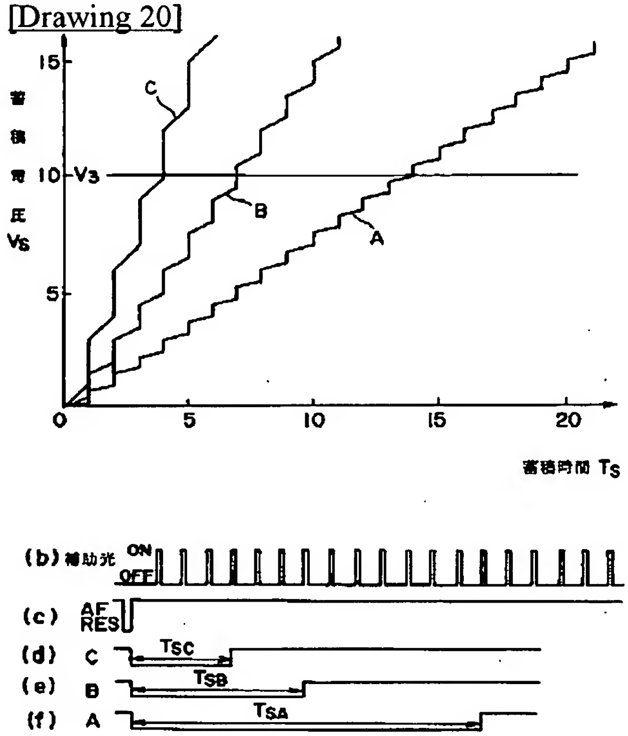
[Drawing 21]



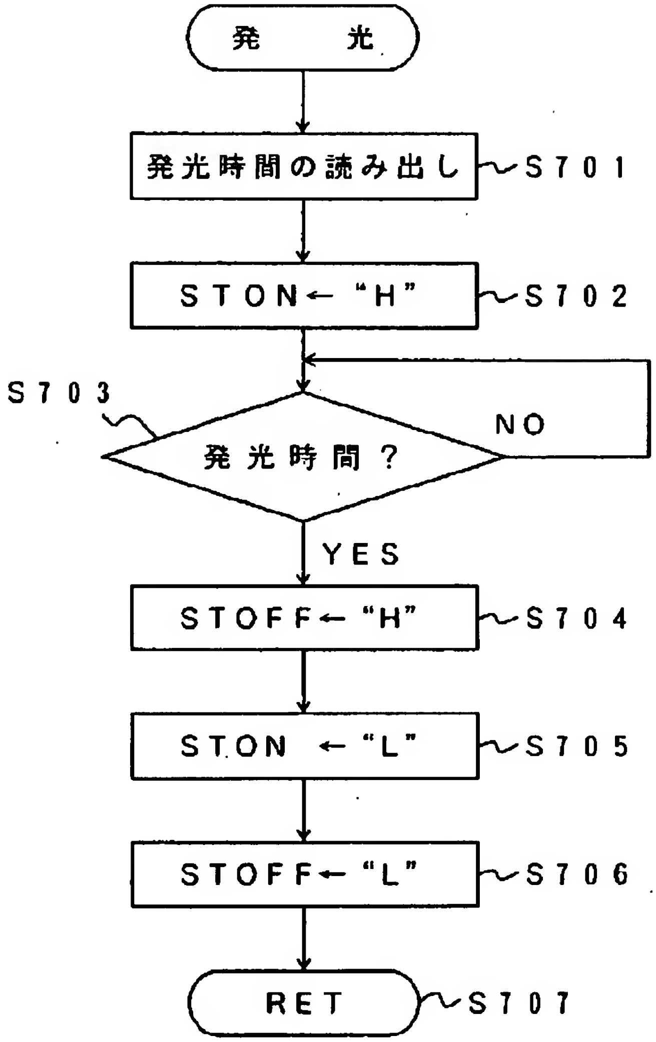
[Drawing 14]



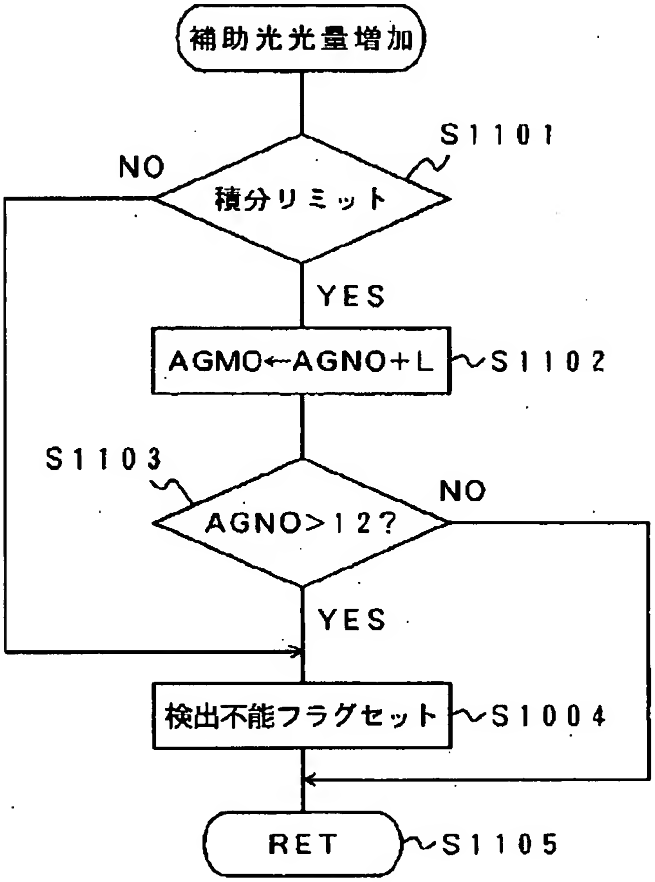
[Drawing 20]



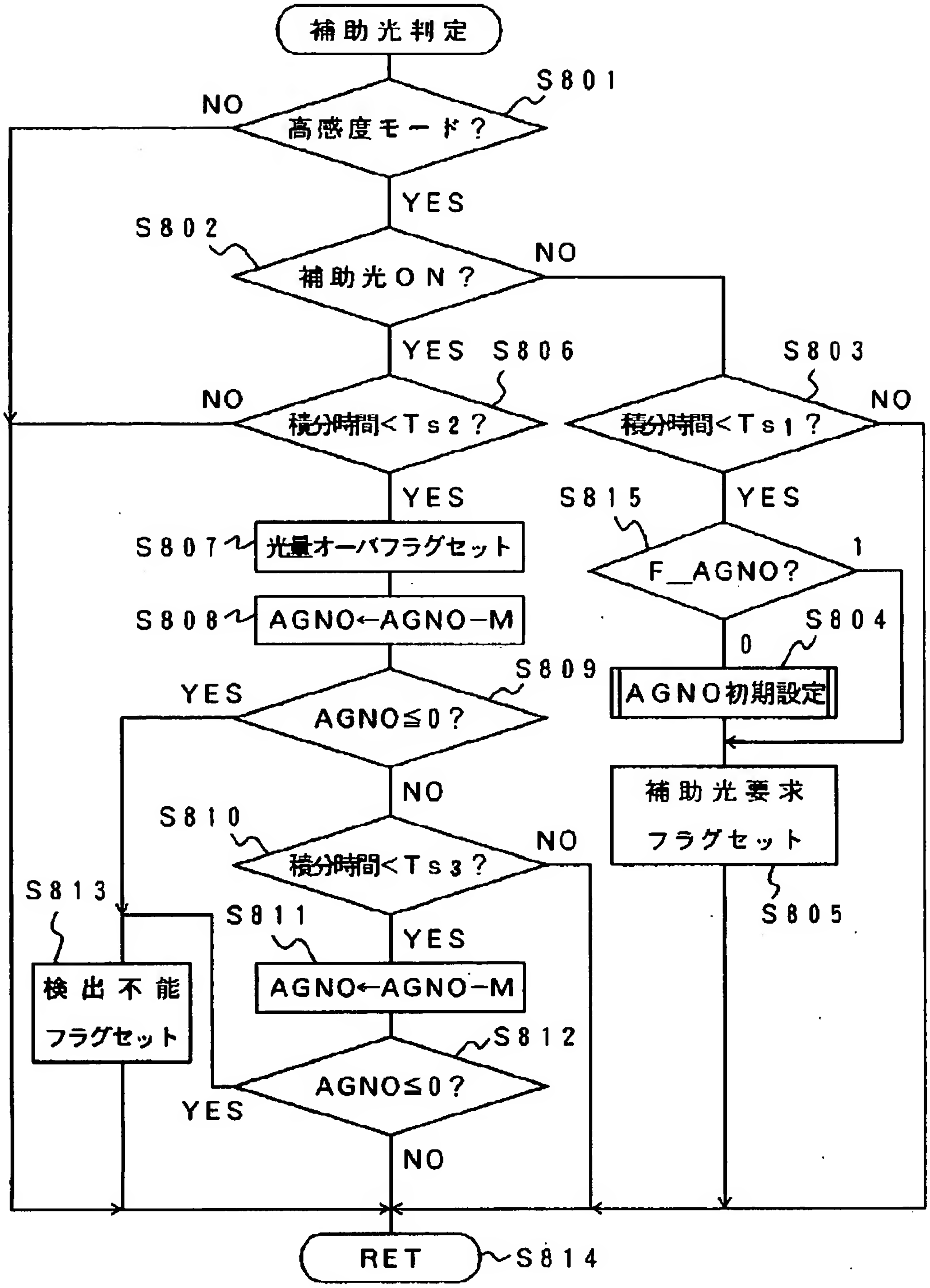
[Drawing 18]


発光
発光時間の読み出し
S701
STON← "H"
S702
S703
発光時間？
NO
YES
STOFF← "H"
S704
STON ← "L"
S705
STOFF← "L"
S706
RET
S707

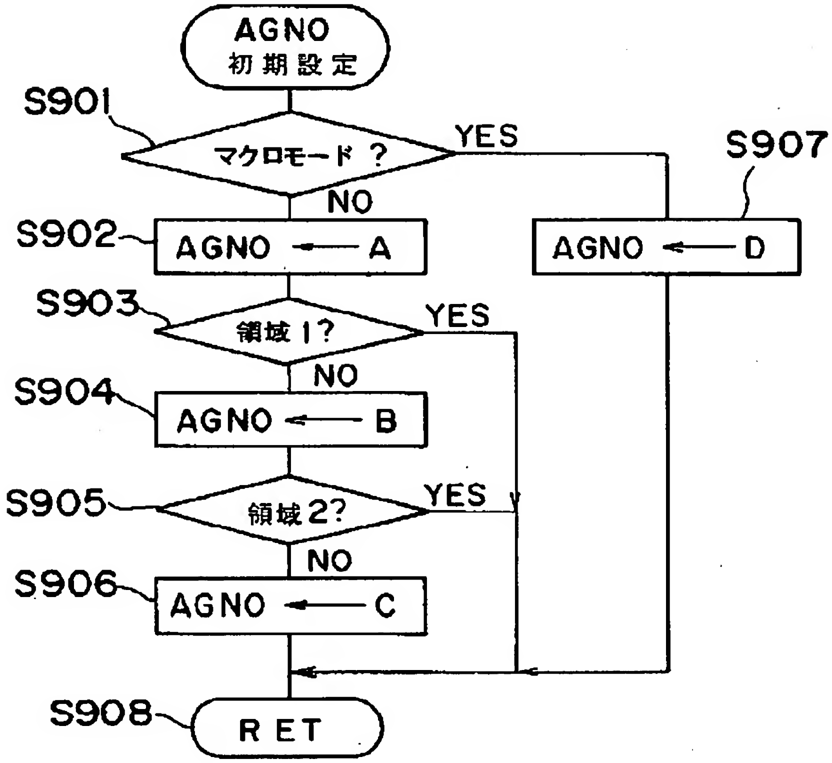
[Drawing 26]


補助光光量増加
S1101
NO
積分リミット
YES
AGMO←AGNO+L
S1102
S1103
NO
AGNO>12?
YES
検出不能フラグセット
S1004
RET
S1105

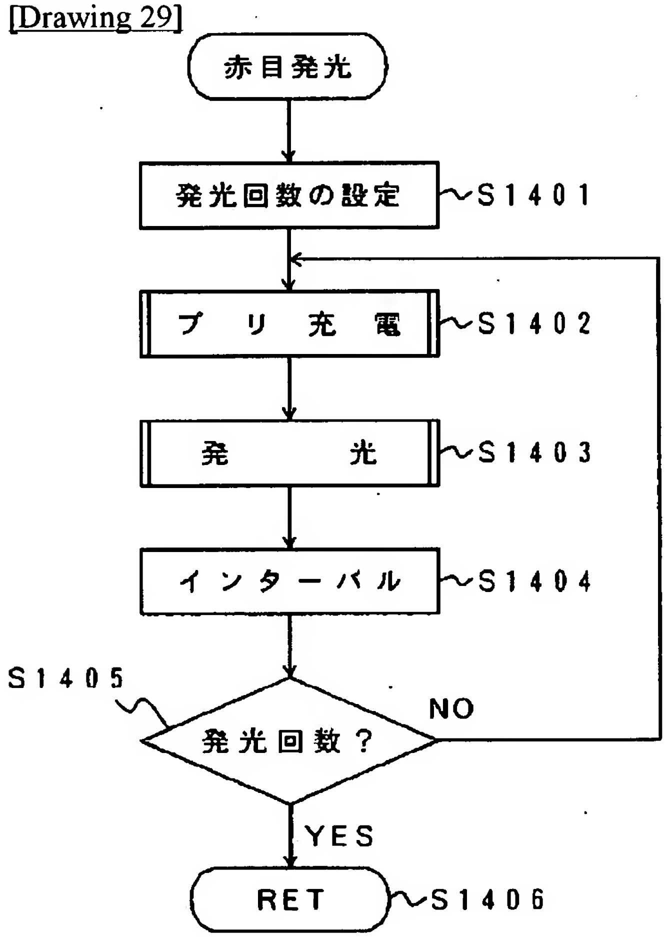
[Drawing 19]


補助光判定
S801
NO
高感度モード？
YES
S802
補助光ON？
NO
YES S806
S803
NO
積分時間<Ts2？
積分時間<Ts1？
NO
YES
S815
YES
S807
光量オーバフラグセット
F_AGNO?
1
S808
AGNO←AGNO−M
S804
0
S809
YES
AGNO初期設定
AGNO≦0？
NO
補助光要求
フラグセット
S810
NO
積分時間<Ts3？
S805
S813
S811
YES
検出不能
フラグセット
AGNO←AGNO−M
S812
AGNO≦0？
YES
NO
RET
S814

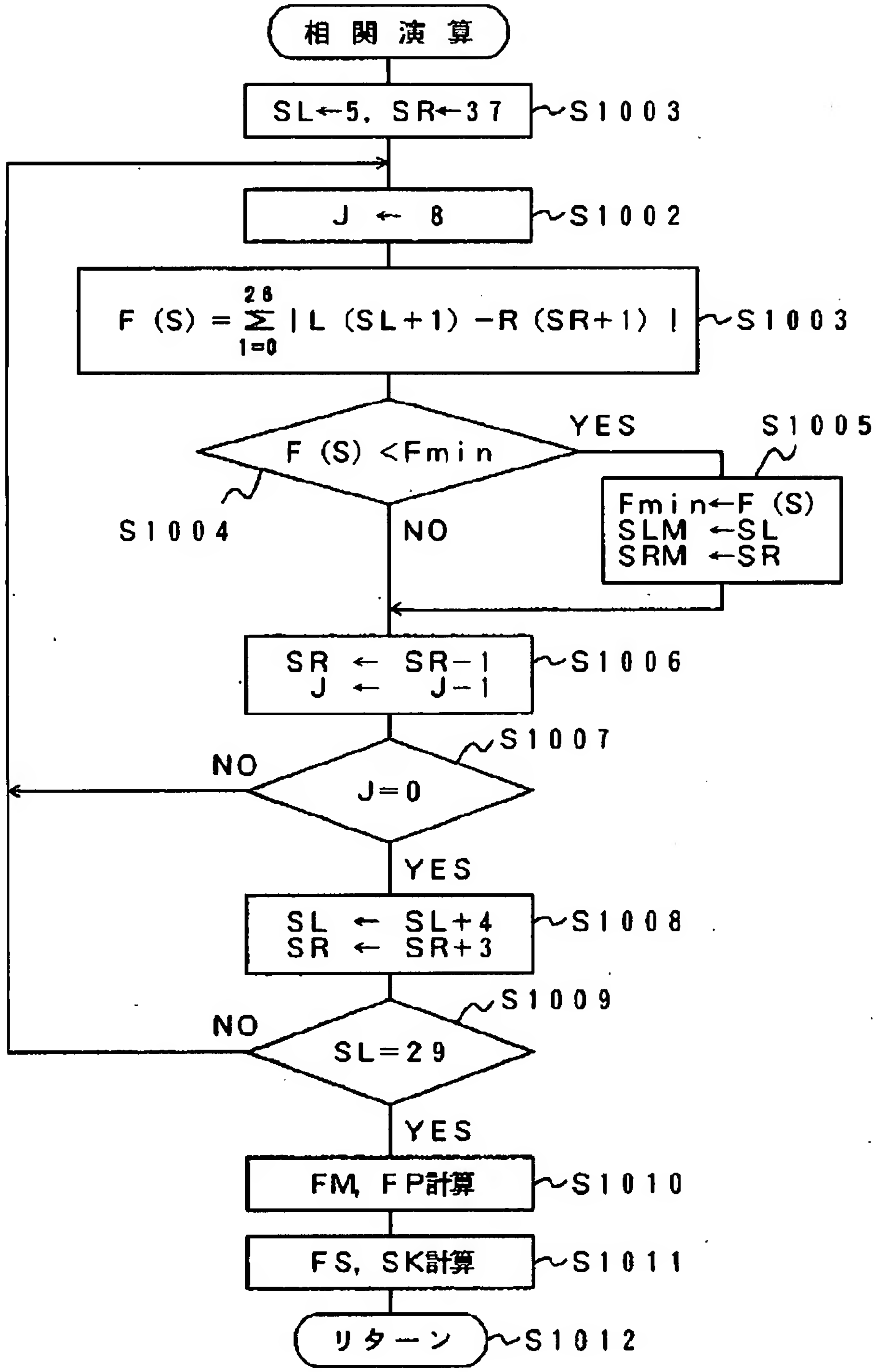
[Drawing 22]



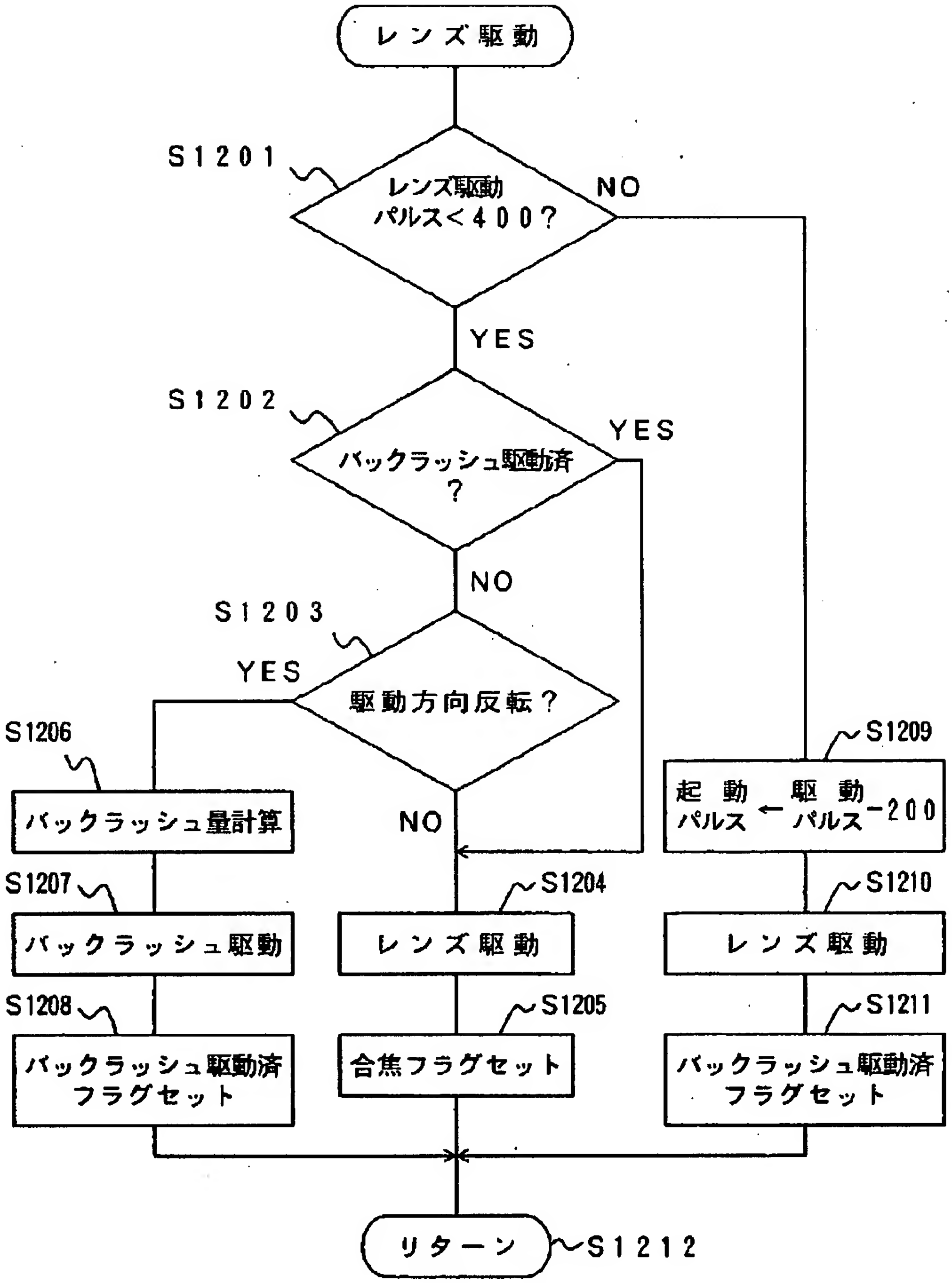
[Drawing 29]



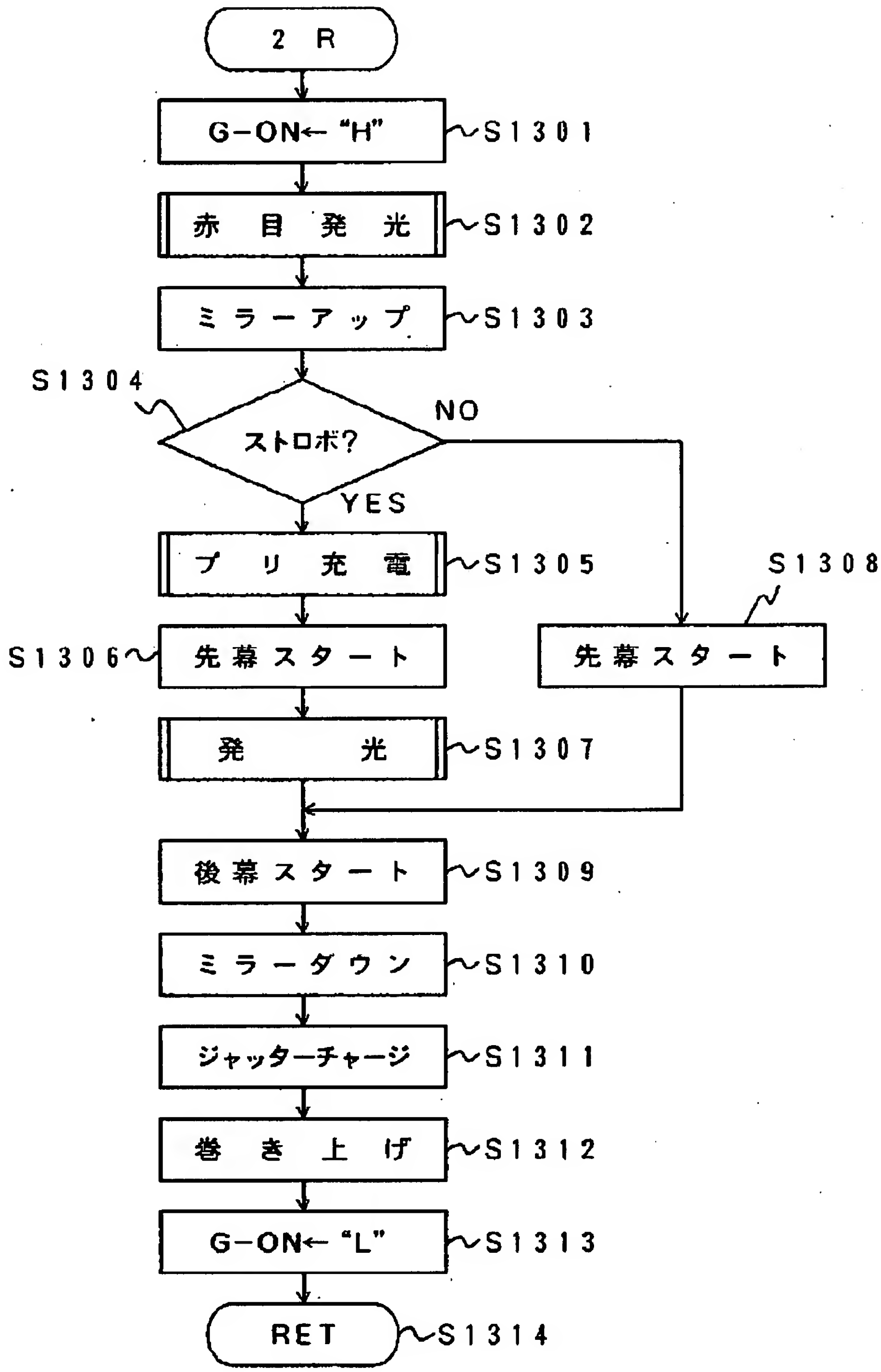
[Drawing 24]


相関演算
SL←5, SR←37
S1003
J ← 8
S1002
F (S) = Σ(1=0 to 28) | L (SL+1) −R (SR+1) |
S1003
F (S) <Fmin
YES
S1005
S1004
NO
Fmin←F (S)
SLM ←SL
SRM ←SR
SR ← SR−1
J ← J−1
S1006
S1007
NO
J=0
YES
SL ← SL+4
SR ← SR+3
S1008
S1009
NO
SL=29
YES
FM, FP計算
S1010
FS, SK計算
S1011
リターン
S1012

[Drawing 27]


レンズ駆動
S1201
レンズ駆動パルス＜400？
NO
YES
S1202
バックラッシュ駆動済？
YES
NO
S1203
駆動方向反転？
YES
NO
S1206
バックラッシュ量計算
S1207
バックラッシュ駆動
S1208
バックラッシュ駆動済フラグセット
S1204
レンズ駆動
S1205
合焦フラグセット
S1209
起動パルス ← 駆動パルス−200
S1210
レンズ駆動
S1211
バックラッシュ駆動済フラグセット
リターン
S1212

[Drawing 28]



[Translation done.]